Illinois U Library

53
78

PHYSICS ABSTRACTS

SECTION A

of

SCIENCE ABSTRACTS

SECTION A, PHYSICS
SECTION B, ELECTRICAL ENGINEERING

Edited and Issued Monthly by
THE INSTITUTION OF ELECTRICAL ENGINEERS

In Association with
THE PHYSICAL SOCIETY
THE AMERICAN PHYSICAL SOCIETY
THE AMERICAN
INSTITUTE OF ELECTRICAL ENGINEERS

E 56 **1953** INDEX NUMBER

AUTHOR INDEX

For the sake of simplicity and uniformity, all names beginning with articles or prepositions are listed as if ten as single words, regardless of nationality (e.g. Van Vleck is listed as if written Vanvleck). Cross-rences are included in appropriate places. Compound names are generally listed under the last component, ss hyphenated; exceptions to this rule have been appropriately cross-referenced. The scheme on pp. x–xi has used for transliteration of names from Cyrillic characters.

An asterisk * following an Abstract Number indicates that an Erratum or Correction will be found on pp. viii–ix.

odt, R. L., Peterson, V. and Phillips, R. $C^{12}(p, pn)C^{11}$ cross section from threshold to 340 MeV, 1107

ts, A. J. J. *See* Clay, J., 2853, 4184

ts, W. H. The change of resistivity of silver and gold on plastic deformation, 3657

s-zade, A. K. Law of heat conductivity of liquids and vapours, 4759

ate, M. J. *See* Blount, E. R., 1493

ott, J. A. and Bolton, H. C. Electrical polarizability as a criterion for molecular wave functions, 4260

elnabi, I. and Massey, H. S. W. Inelastic collisions of electrons in helium and Townsend's ionization coefficient, 3391

El-Wahab Khalil, M. Anomalies of the absorption curve of cosmic radiation in lead, 8496

, H. and Shimada, J. Anomalous magnetic resonance absorption of copper acetate at 40 kMc/sec, 4914

lé, J. Velocity, qualitative magnitude and relativistic mechanics, 1363

lès, F. On a method for measurements of optical constants by reflection, 3092. Two new methods allowing the determination of the index and the thickness of a thin transparent film, 6596. Coefficients of reflection and transmission of very thin metallic films. New method for determining thin indices and thicknesses, 8343

l's, V. R. *See* Parfenov, V. V., 5600

ragam, A. *See also* Pound, R. V., 6203; Yvon, J., 8561

ragam, A., Horowitz, J. and Yvon, J. Attempt to interpret the magnetic properties of certain molecules containing three iron atoms, 967

ragam, A. and Kambe, K. Dipolar broadening of the quadrupole resonance line width in zero applied field, 7841

ragam, A. and Pound, R. V. Influence of the nuclear quadrupole moment on the α–γ angular correlation in radiothorium, 5011

raham, B. M. *See also* Weinstock, B., 2415

raham, B. M., Osborne, D. W. and Weinstock, B. Properties of liquid helium 3, 3252

rahams, E. *See also* Kittel, C., 4217, 8537

rahams, E. and Kittel, C. Spin-lattice relaxation in ferromagnets, 1739

rahams, S. C. On the disorder in crystalline 2,2-dinitropropane at room temperature, 7293

rahams, S. C. and Grison, E. The crystal structure of cesium hexasulfide, 2824

rikosov, A. A. Influence of size on the critical field of superconductors of the second group, 5475. Determination of the value of the dielectric constant and normal conductivity of superconductors, 5483

cardi, L. New apparatus for recording the atmospheric electric field, 4515

cardo, C. A. *See* Lehovec, K., 1554

kermann, G. *See* Schrader, R., 8581

kland, R. G. An overload device for X-ray sets, 7708

quista, N. *See also* Plyler, E. K., 2328, 3982

quista, N. and Plyler, E. K. Calibrating wavelengths in the region from 0·6 to 2·6 microns, 2329

achi, K. *See* Hirone, T., 4110

air, E. R. Duration and light-dark ratio of intermittent preadaptation as factors influencing human dark adaptation, 2111

air, R. K. *See also* Miller, D. W., 456

air, R. K., Okazaki, A. and Walt, M. Scattering of neutrons by deuterons, 4392

am, G. D. and Standley, K. J. Microwave resonance absorption in some ferromagnetic manganese compounds, 8551

Adam, J., Green, A. and Dugdale, R. A. An effect of electron bombardment on order in Cu_3Au alloy, 3730

Adams, C. E. *See* Parker, J. G., 3046

Adams, E., Hubbard, W. M. and Syeles, A. M. A new permanent magnet from powdered manganese bismuthide, 320

Adams, E. N., II. Magnetic susceptibility of a diamagnetic electron gas—the role of small effective electron mass, 2551

Adams, G. B., Jr, Johnston, H. L. and Kerr, E. C. The heat capacity of gallium from 15 to 320°K. The heat of fusion at the melting point, 3272

Adams, H. E. *See* Stephenson, C. C., 181

Adams, J. B., Hine, M. G. N. and Lawson, J. D. Effect of magnet inhomogeneities in the strong-focusing synchronotron, 6857

Adams, K. B. *See* Burns, K., 117

Adams, M. *See* Ingram, M., 2868

Addison, C. C. and Litherland, D. Dynamic potentials of freshly formed liquid surfaces, 4115

Adel, A. The atmospheric window, 16 to 24 microns, and the second fundamental of nitrous oxide, 133. Identification of carbon monoxide in the atmosphere above Flagstaff, Arizona, 4497. Absorption line width in the infrared spectrum of atmospheric carbon dioxide, 5960

Adell, O. *See* Brogen, G., 7302

Adler, H., Huber, P. and Hälg, W. Reaction cross-section and Q-value of the Cl^{35} (n, α) reaction, 8685

Adler, S. *See* Freund, T., 3433

Adloff, J.-P. *See* Perey, M., 5190, 7270

Aeschlimann, F. On the geometric representation of corpuscles and the triple-wave method, 5289

Afanas'eva, V. I. and Kalinin, Yu. D. One particular characteristic of the geographical distribution of the field of a magnetic atom, 2838

Affleck, J. H. *See* Eisenstein, A., 6910

Agashe, V. V. The study of the changes in pressure rise and current in a low frequency discharge due to irradiation, 873

Ageeva, N. S., Zhukov, I. P., Isakovich, M. A., Sosedova, A. L. and Sukharevskiĭ, Yu. M. Electromechanical Q-meter; a set-up for measuring the elastic modulus and losses of materials by ultrasonic oscillations, 1187

Ageno, M. and Cortellessa, G. On the fluorescence excited by alpha-particles in stilbene, 3171

Ageno, M., Cortellessa, G. and Querzoli, R. Measurement of total collision cross-sections for 14 MeV neutrons, 2719. Measurement of nuclear rays [neutron cross-sections] of sulphur and copper, 3601. A case of ageing of liquid scintillators, 8470. Total cross-sections of several elements for 14 MeV neutrons, 8686

Ageno, M. and Querzoli, R. On the mechanism of scintillations in solutions, 2363

Aggarwal, R. R. Axially symmetric vibrations of a finite isotropic disk. II, 669; III, 5337

Agius, P. and Darwent, B. deB. The reaction of Cd($^3P_1$) with propane at low conversion, 1211

Agnew, J. T., Lisan, P. and Boyd, M. J. The use of infrared absorption techniques in the study of hypersensitivity diseases, 1318

Ahearn, A. J. and Hannay, N. B. The formation of negative ions of sulfur hexafluoride, 1708

Ahlers, N. H. E. and Freedman, H. P. A double-beam system for infra-red spectrometers employing rotating twin cells, 8312

Ahrens, L. H. Wavelength tables of sensitive lines, 1235. *See also* Aldrich, L. T., 2630

Ahrens, T. Pseudoscalar interaction in the theory of beta-decay. II, 5863

AUTHOR INDEX

Aigrain, P. and Bulliard, H. On the photo-magneto-electric effect. Experimental results on the photo-magneto-electric effects, 4812
Aigrain, P., Lagrenaudie, J. and Liandrat, G. Modulation of the conductance of a semiconductor by an electric field, 1635
Aitken, K. L. *See also* Palmer, G. H., 8465
Aitken, K. L., Littler, D. J., Lockett, E. E. and Palmer, G. H. Pile neutron absorption cross sections of lead 206 and 207, 1130
Aĭvazyan, M. T. *See* Kocharyan, N. M., 5550
Aizu, K. and Kinoshita, T. On a possible model of the *V*-particle, 462
Ajzenberg, F. Deuteron bombardment of Be^9 and classification of levels of B^{10}, 439. The preparation of Li^6 targets, 1101
Ajzenberg, F. and Buechner, W. W. Neutrons from the proton bombardment of Be^9, 7915
Ajzenberg, F. and Lauritsen, T. Energy levels of light nuclei. IV, 2604
Akeley, E. *See* Swihart, J., 6833
Akhiezer, A. and Polovin, R. Radiative corrections to the scattering of electrons by electrons, 8223
Akhiezer, A. and Pomeranchuk, I. Paramagnetic dispersion, 5570
Akhiezer, A. I. and Polovin, R. V. Plasma oscillations in crossed electric and magnetic fields, 6151
Akhiezer, A. I. and Sitenko, A. G. On the passage of a charged particle through an electron plasma, 3329
Akimoto, S. *See* Nagata, T., 963–4
Akobjanoff, L. Constancy of the products $A\lambda$ and $D\lambda$ in the absorption and scattering of photons, 761
Akulov, N. S. and Bol'shova, K. M. The magnetization curve for plastic deformed iron in strong fields, 5574
Akulov, N. S. and Elkina, T. A. Some new relationships between loss value and coercive force, 5572
Alba Andrade, F. Non-planar orbits of a particle in the field of a rotating sphere according to Birkhoff's theory, 595
Alberigi, A., Lepri, F. and Stoppini, G. A special pulse amplifier giving time selection, 1704
Albers-Schönberg, H., Hänni, F., Heer, E., Novey, T. B. and Scherrer, P. Effect of the electric quadrupole interaction on the gamma-gamma directional correlation in Cd^{111}, 5032
Albers-Schönberg, H., Heer, E., Novey, T. B. and Rüetschi, R. Effect of the electric quadrupole interaction on the γ–γ directional correlation in Cd^{111}. II, 7103
Albertoni, S. and Cugiani, M. On the problem of the transformation of variables in the theory of distribution. II, 7428
Albrecht, A. C. and Simpson, W. T. The excited electronic state of the 2600 Å transition in benzene, 6624
Albrecht, H. O. *See* Mandeville, C. E., 4036, 6657, 7591
Alburger, D. E. The decay of Rh^{106}, 404. The beta-decay of F^{20}, 1879. Pair measurement of gamma-rays with a lens spectrometer, 1900. The beta-decay of ^{20}F, 5015. The decay scheme of ^{106}Rh, 5675. *See also* Lindström, G., 4323
Alburger, D. E. and Thulin, S. Identification of the seven-hour Mo^{93} isomer, 4300
Alcock, G. E. D. and Prentice, J. P. M. The Quadrantid meteor shower radiants from duplicate observations, 5275
Alder, B. J. *See also* Harris, F. E., 6030, 7658, 7819
Alder, B. J. and Jura, G. Note on the critical temperature of solids, 183
Aldrich, L. T., Herzog, L. F., Holyk, W. K., Whiting, F. B. and Ahrens, L. H. Variations in isotopic abundances of strontium, 2630
Aleksandrov, A. D. Einstein's paradox in quantum mechanics, 5305. The meaning of wave functions, 7463
Alekseevskiĭ, N. E. Superconductivity of alloys of the system Bi–Pd, 5481. Superconductivity of alloys of bismuth with rubidium and caesium, 6058
Alercio, J. S. and Harley, J. H. Evaluation of alpha-particle absorption by filter paper, 2664
Alers, G. A. Internal friction of quartz, 3673
Alexander, A. E. *See* Anderson, J. R., 3284
Alexander, B. H. *See* Balluffi, R. W., 1172
Alexander, J. T. and Nastuk, W. L. An instrum for the production of microelectrodes used in elect physiological studies, 8140
Alexander, L. The effect of vertical divergence X-ray powder diffraction lines, 7313. A simple versatile strip technique for calculating struct factors, 8787
Alexander, P. and Fox, M. Mode of action of age giving protection from radiation, 2117
Alexopoulos, K. and Brogren, G. Spectrum of Compton radiation from solids, 1090. Evidence a band structure in the Compton radiation fr solids, 4828
Alford, W. L. and Leighton, R. B. Mean lifetimes *V*-particles and heavy mesons, 5108
Alfsen, E. Multiple magnetic scattering, 474
Alikhanyan, A., Dadayan, A. and Shostakovich, On particles with masses 600–1000 M_e in the co position of cosmic rays, 5551
Alikhanyan, A. and Kharitonov, V. Particles of mass intermediate between those of the meson a the proton, 5552
Alkemade, C. T. J. Effects of ionization in an a acetylene flame, 3122
Allain, Y. *See* Le Bot, J., 6755; Le Montagner, 831
Allander, C. G. Study of the adsorption process layers of adsorbent with linear adsorption isother 8746
Allcock, G. R. Damping corrections in the phot meson process, 3618
Alldredge, L. R. *See* Whiteley, T. B., 84
Allen, A. J. *See* Arthur, J. S., 1834; Bender, R. 270; Hausman, H. J., 1835
Allen, A. O. *See* Johnson, E. R., 3688
Allen, G. Band structures of one-dimensional cryst with square-well potentials, 8053
Allen, H. C., Jr, Cross, P. C. and Wilson, M. K. T asymmetric rotor. X. The hydrogen sulfide sp trum in the 5150 cm^{-1} region, 1012
Allen, J. A. Effect of pressure on the oxidation rate copper at moderate temperatures, 2007
Allen, J. R. The ultraviolet absorption of sil bromide, 2360
Allen, K. R., Lipsicas, M., Williams, W. F. a Fotheringham, D. Stereoscopic cameras for with a Wilson cloud chamber, 7371
Allen, K. W. *See* Almqvist, E., 8674
Allen, N. L. and Pickup, E. The use of simple ba graph in cosmic ray balloon flights, 3768
Allen, P. J. A microwave magnetometer, 3420
Allen, R. Van. *See* Van Allen, R.
Allen, W. A. Two ballistics problems of future tra portation, 2219. *See also* Parkin, P. H., 3074
Allen, W. A. and McCrary, C. L. Experimen technique used to measure transient waves thro solids, 3035
Allen, W. A. and Mayfield, E. B. Time-resol spectroscopy of ultraspeed pellet luminosity, 309
Aller, L. H. and Pierce, A. K. Model solar atm spheres, 2150
Allin, E. J. *See* Noakes, G. E., 1674
Allison, B. A. *See* Scherrer, V. E., 8687
Allison, S. K. The breakup energy of Be^8, 7863
Allison, S. K. and Casson, H. The scintillation sponse from NaI (Tl) crystals under bombardm with positive ions of energies 60–600 keV, 5976
Allred, J. C. *See also* Rosen, L., 1115
Allred, J. C., Armstrong, A. H., Bondelid, R. O. Rosen, L. Elastic scattering of 9·7-MeV protons deuterium and by hydrogen, 911
Allred, J. C., Armstrong, A. H., Hudson, A. Potter, R. M., Robinson, E. S., Rosen, L. Stovall, E. J., Jr. Elastic scattering of 10-M deuterons by H^3 and He^3, 1114
Allred, J. C., Armstrong, A. H. and Rosen, L. interaction of 14-MeV neutrons with protons deuterons, 7185
Alluisi, E. A. and Harker, G. S. The stereoptomete a simple haploscopic instrument for the study binocular space perception, 8148
Alma, G. A., Diemer, G. and Groendijk, H. A rub membrane model for tracing electron paths in sp charge fields, 7712

mkvist, G. and Lagerqvist, A. Ultra-violet band system of strontium oxide (SrO), 1505

mond, M. The orbit of the δ Aquarid meteor stream, 7395

mond, M., Bullough, K. and Hawkins, G. S. Radio echo observations of the daytime meteor streams in 1952, 7394

mqvist, E., Allen, K. W., Dewan, J. T. and Pepper, T. P. The reactions He^3 (He^3, *p*) Li^5 and T(He^3, *p*) He^5, 8674

mqvist, S. and Johansson, S. A. E. Scintillation spectrometer studies on the decay schemes of silver-110, antimony-124 and iodine-131, 1053

my, G. M. *See* Butler, W. A., 7144

on, I., Arsac, J. and Steinberg, J.-L. On the distribution of brightness across the sun at a frequency of 9350 Mc/s, 8190

pern, M. Metacontrast, 8147. *See also* Fry, G. A., 4526–7

pert, D. New developments in the production and measurement of ultra high vacuum, 8274

pert, M. *See* Nielsen, J. R., 5962

pher, R. A. Initial conditions for a non-equilibrium theory of element formation, 6437

tenburg, K. The temperature dependence of the ultrasonic velocity and surface tension of ethylene glycols, 5891. The thermal expansion of high polymers, 6303. Effect of ultrasonics on the processes of migration of particles in liquids, 8267. The velocity of sound in high polymers, 8287

tenburg, K. and Dörr, G. The influence of ultrasonics on the electrical conductivity of $CuSO_4$ and $Pb(NO_3)_2$ solutions, 1214

tenburg, K. and Kästner, S. Demodulation of ultrasonic waves in liquids, 1447

tenhein, H. J., Molière, K. and Niehrs, H. Determination of inner potentials and structure factors from the fine structure of the electron–diffraction maxima of small crystals, 1268

thaus, E. J. and Sard, R. D. A cloud-chamber study of neutron production by sea-level cosmic rays, with particular reference to μ-mesons stopped in lead, 6927

tman, A. *See* Sloan, L. L., 5823

tman, D. and Farber, M. Hydrogen–fluorine flame temperatures, 6717

tmann, S. L. *See* Coulson, C. A., 4953

tshuler, S. Excitation cross section for helium atoms. II, 3574. Applications of variational principles to scattering problems, 3882

'tshuler, S. A., Kurenev, V. Ya. and Salikhov, S. G. Paramagnetic resonance absorption in metals, 5568

tshuller, A. P. The dielectric constants of water/ethyl alcohol mixtures, 4076

varez, L. W. *See* Jenkins, F. A., 165

y, S. M. An electric method for measuring conduction of heat through gases, 4760

macher, H. C. *See* Metzger, F. R., 423

makasu, K. Excess thermal noise due to current flow through (Ba Sr) oxide coating, 1711

makasu, K. and Imai, T. Emission decay phenomena due to the contaminated anode, 3399*

maldi, E., Castagnoli, C., Gigli, A. and Sciuti, S. On the interaction of cosmic rays with matter under 50 meters water equivalent, 4194, 7781

maldi, E., Mezzetti, L. and Stoppini, G. On the longitudinal development of air showers according to Fermi's theory of meson production, 8495

mar, H. A general relativistic approach to short-range forces, 3851

mat, G. *See also* Grenier-Besson, M. L., 1529, 3138

mat, G., Barchewitz, P. and Grenier-Besson, M-L. The vibration spectrum of nitrous oxide in the neighbourhood of 4 μ, 7581

mberg, C. H. and McIntosh, R. A study of adsorption hysteresis by means of length changes of a rod of porous glass, 2794

mbler, E., Grace, M. A., Halban, H., Kurti, N., Durand, H., Johnson, C. E. and Lemmer, H. R. Nuclear polarization of cobalt 60, 5653

mbler, E. and Kurti, N. Film flow and the behaviour of He cryostats below the λ-point, 1587

mbrosino, G. *See* Anthony, J. P., 6886; Hinschberger, G., 7084

Amdur, I., Ross, J. and Mason, E. A. Intermolecular potentials for the systems CO_2–CO_2 and CO_2–N_2O, 349

Amelinckx, S. Interferometric examination of quartz crystals, 1238. Growth spirals and their relation to crystal habit as illustrated by apatite, 1242. Relations between the symmetry of a crystal and that of the growth spirals which it can exhibit, 1243. Spiral patterns on salocrystals, 2808. A dislocation mechanism for the growth of hopper crystal faces and the growth of salol crystals from solution and from the melt, 5194. Theory and observations on the growth of crystals of salol, 8046. *See also* Gevers, R., 2055; Votava, E., 4465

Ament, W. S. Toward a theory of reflection by a rough surface, 2564. Sound propagation in gross mixtures, 5912

Ames, D. P., Bunker, M. E., Langer, L. M. and Sorenson, B. M. The disintegration of Sr^{91} and Y^{91m}, 7077

Amiot, R., Doucet, Y. and Watelle, G. New characteristic value in the flocculation of a sol by an electrolyte, 8032

Amitsur, S. *See* Many, A., 2899

Amorós, J. L. *See* Torroja, J. M., 5204

Amphlett, C. B. Reduction of ferric ion in aqueous solution by γ-radiation, 5760

Anantakrishnan, S. V. Raman effect and its chemical applications. Twenty-five years in retrospect, 5411

Anantharaman, T. R. and Christian, J. W. The existence of a macroscopic shear in the transformation in cobalt, 2755. The measurement of X-ray line breadths, 7308

Ancker, B. Precision investigations on the zinc lattice. I. Precision measurement of lattice constants and investigations on lattice distortions, 7321; II. On the production of twins, 7322

Anderko, K. *See* Schubert, K., 552, 8097

Anders, F. J. *See* Hoffman, R. W., 3724

Anders, T. Bending of acoustic waves at a small circular opening, 8294

Andersen, E. *See* Lundby, A., 5539

Andersen, F., Andersen, J. R., Bak, B., Bastiansen, O., Risberg, E. and Smedvik, L. Electron diffraction and microwave investigation of tertiary butyl fluoride, 3137

Andersen, J. R. *See* Andersen, F., 3137

Anderson, A. B. C. Dependence of *Pfeifenton* (pipe tone) frequency on pipe length, orifice diameter, and gas discharge pressure, 672. Dependence of the primary *Pfeifenton* (pipe tone) frequency on pipe-orifice geometry, 5350. A circular-orifice number describing dependency of *primary Pfeifenton* frequency on differential pressure, gas density, and orifice geometry, 5906

Anderson, C. D. *See* Leighton, R. B., 1943

Anderson, C. E., Wheeler, G. W. and Watson, W. W. The mass of Cl^{39} and of A^{39}, 391. Inner bremsstrahlung associated with *K* capture in A^{37}, 5001

Anderson, D. V. The propagation of a pulse between plane parallel plates, 3032

Anderson, D. V. and Barnes, C. The dispersion of a pulse propagated through a cylindrical tube, 5346

Anderson, E. C. *See also* Cowan, C. L., Jr, 6108; Freedman, A. J., 285

Anderson, H. L., Fermi, E., Martin, R. and Nagle, D. E. Angular distribution of pions scattered by hydrogen, 7176

Anderson, H. L., Marshall, J., Kornblith, L., Jr, Schwarcz, L. and Miller, R. Synchrocylotron for 450-MeV protons, 1685

Anderson, H. R., Jr, Scheraga, H. A. and VanArtsdalen, E. R. Bromination of hydrocarbons. VI. Photochemical and thermal bromination of toluene. Bond dissociation energies, 8024

Anderson, J. G. *See* Hagenguth, J. H., 1295

Anderson, J. M. *See* Bronzo, J. A., 689; Goldstein, L., 4929, 5492

Anderson, J. R. and Alexander, A. E. Theory of the vibrating condenser converter and application to contact potential measurement, 3284

Anderson, J. S. and Greenwood, N. N. The semiconducting properties of cuprous oxide, 2447

Anderson, J. T. and Saunders, O. A. Convection from an isolated heated horizontal cylinder rotating about its axis, 6704

Anderson, L. J. Attenuation of microwaves by atmospheric gases and by rainfall, 1301
Anderson, L. J. and Gossard, E. E. Oceanic duct and its effect on microwave propagation, 8592
Anderson, N. G. and Dawson, I. M. The study of crystal growth with the electron microscope. III. Growth-step patterns and the relationship of growth-step height to molecular structure in *n*-nonatriacontane and in stearic acid, 7282
Anderson, N. S. Longitudinal magneto-hydrodynamic waves, 5339
Anderson, O. L. Extension of remarks on the derivation of the stress deviator tensor, 2768
Anderson, P. A. A direct comparison of the Kelvin and electron beam methods of contact potential measurement, 826
Anderson, P. W. The concept of spin-lattice relaxation in ferromagnetic materials, 1740
Anderson, P. W. and Weiss, P. R. Exchange narrowing in paramagnetic resonance, 8514
Andrade, E. N. da C. Viscosity and thermal conductivity of liquid argon, 1406. A discussion on theory of liquids: Viscosity of liquids, 2240. The flow of metals, 3651. Critical shear stress and temperature, 3658. The effect of surface conditions on the mechanical properties of metals, mainly single crystals, 4400
Andrade, F. Alba. *See* Alba Andrade, F.
André, C. G. *See* Carothers, J., 1938
Andreasen, P. *See* Arley, N., 4492
Andreev, D. I. *See* Vol'kenshtein, A. A., 5937
Andreev, I. S. Investigation of the electron emission from a metal in the range of its transition from the cold into the thermionic state, 6080
Andrejewski, W. The diffraction of electromagnetic waves by a conducting disc and by a circular aperture in a plane conducting screen, 8588
Andress, K. R. and Fischer, K. Preliminary communication on the crystal structure of silver sulphimide $Ag_3(NSO_2)_3.3H_2O$, 8109
Andrew, A. and Davidson, C. R. Induced thermoelectric potential from radiation damage, 3320
Andrew, E. R. Nuclear magnetic resonance modulation correction, 7840
Andrew, E. R. and Eades, R. G. A nuclear magnetic resonance investigation of solid *cyclo*hexane, 4267. Separation of the intramolecular and intermolecular contributions to the second moment of the nuclear magnetic resonance spectrum, 6161. A nuclear magnetic resonance investigation of three solid benzenes, 6985
Andrew, E. R. and Rushworth, F. A. Ring shims for coned magnet polecaps, 316
Andrews, D. H. *See* Haley, F. C., 2468
Andrievskiĭ, A. I. and Rvachev, A. L. The infrared sensitivity of copper oxide photocells fabricated under a reduced pressure in a field of high frequency current, 6798
Andronikashvili, É. L. Some questions in the hydrodynamics of helium II, 3256
Andrus, J. *See* Galt, J. K., 8575
Angell, C. E. and Perry, J. P. The total cross sections of 37 MeV pions in hydrogen, 6235
Angelov, B. P., Lobanov, E. M. and Starodubtsev, S. V. Action of a stream of electrons on the sensitive layer of valve photocells, 7676
Angerer, G. *See* Briegleb, G., 5955
Angona, F. A. Attenuation of sound in a tube, 3942
Aniansson, G. and Steiger, N. H. Use of radioactive alpha-recoil in the study of soluble ionized surface layers, 8034
Anikina, L. I. The effect of the fluorescent action of the exciting light on the yield of phosphorescence, 6649
Annaev, R. G., Dubrovskiĭ, V. G. and Kapustyan, E. K. The measurement of electrical resistance of the alloy Fe_3Pt in a longitudinal magnetic field, 7689
Annaev, R. G. and Kolodin, M. V. Thermomagnetic effect of the alloy Fe_3Pt, 5604
Annaka, S. A new effect of cold work on powder X-ray patterns, 485
Annis, M., Bridge, H., Courant, H., Olbert, S. and Rossi, B. S-particles, 8483
Annis, M., Bridge, H. S. and Olbert, S. Application of the multiple scattering theory to cloud-chamber measurements. II, 4884
Annis, M. and Harmon, N. F. τ-meson decay in fligh 1932
Ansbacher, F. and Jason, A. C. Effects of water vapo on the electrical properties of anodized aluminiu 3285
Ansel'm, A. I. The distribution of the concentration the current carriers in the Hall effect in a sem conductor, 6038
Anta, M. do Carmo. *See* do Carmo Anta, M.
Anthony, J.-P. *See also* Leuba, P., 4735
Anthony, J. P. and Ambrosino, G. Response of a zi sulphide screen to α rays of energy less than 5 Me 6886
Antipina, S. A. and Maslov, P. G. Vibration spect and action coefficients of the ethane and deuter ethane molecules, 1006
Anton'eva, N. M. *See* Bashilov, A. A., 5684
Antonov-Romanovskiĭ, V. V. Kinetics of pho phorescence, 7585
Antweiler, H. J. Method of measurement for se mentation, electrophoresis, and diffusion phen mena, using an apparatus with a great light-tran mitting capacity. An instrument for the measu ment of diffusion constants, 159
Antzenberger, P. *See* Fournet, G., 5729
Apker, L. *See also* Huntington, H. B., 2449; Taft, 232, 2460
Apker, L. and Taft, E. A. Photoconduction in ano Ta_2O_5, 233. Field emission from photoconducto 887
Apker, L., Taft, E. and Dickey, J. Electron scatteri and the photoemission from cesium antimoni 2461
Appalanarasimham, N. *See* Asundi, R. K., 735, 233 4011; Dayal, B., 8721
Appelbe, B. *See* Kay, H. F., 4467
Appen, A. A. and Bresker, R. I. Dependence of t dielectric constant and the loss angle of silica glasses on their composition, 834
Appleton, E. Storm phenomena in the ionosphe 7351
Appleton, G. L. *See* Halpern, O., 6243
Apps, D. C. The use of binaural tape recording automotive noise problems, 1475
Aprison, M. H. *See* Clemmons, J. J., 7368
Apté, A. An approximate solution of the problem the solitary wave, 7489
Arabadzhi, V. I. Some characteristics of thunder, 28
Aragão, M. B., Frota-Pessôa, E. and Margem, N. new radioactive method for marking mosquito 2106
Araki, G. and Murai, T. Theory of absorption spect of carotenoids according to Tomonaga-gas model π-electrons, 362*
Arase, E., Goldhaber, G. and Goldhaber, S. Elas pion-deuteron scattering, 5105
Arata, H. *See* Yoshida, S., 6090
Archard, G. D. Anomalous lattice constants of zi oxide, 8100
Archard, J. F. Theory of mechanical wear, 1994. Co tact and rubbing of flat surfaces, 8002
Archard, J. F., Clegg, P. L. and Taylor, A. M. Phot electric analysis of elliptically polarized light, 168
Archbold, R. B. An experimental probe micropho for the measurement of sound pressures, 3959
Archer, J. E. *See* Harrison, G. R., 109
Ardley, G. W. and Cottrell, A. H. Yield points brass crystals, 7993
Ardonova, S. I. The de-ionization and striking pote tial of a rarefied gas with residual ionization, 936
Arens, H. The Sabattier effect. VI, 6358
Argence, E. Action of the earth's magnetic field on propagation of short waves. Application to calculation of the "maximum usable frequency 8595
Argence, E., Rawer, K. and Suchy, K. Influence the terrestrial magnetic field on the absorption short waves in the ionosphere (normal incidenc 3461
Argue, A. N. Photoelectric stellar photometry using E.M.I. photomultiplier, 6430
Arizumi, T. and Maekawa, S. The evolution of from nickel plate, 1961
Arkad'ev, V. K. and Kotov, A. G. Ferromagne resonance in parallel wires, 5567

AUTHOR INDEX

ley, N., Andreasen, P., Espersen, J. and Olsen, J. Magnetic measurements in deep-sea investigations. Magnetic investigations on the Galathea expedition, 4492

ley, N., Lunn, B., Nielsen, M. and Nørgaard, C. Magnetic measurements in deep-sea investigations. Construction of non-magnetic containers, 4492

mbruster, R. *See* Gorodetsky, S., 7879

menteros, R., Barker, K. H., Butler, C. C., Coates, M. S. and Sowerby, M. G. The mass of the V_1^--particle, 7956

mington, J. C. Electrical responses of the light-adapted eye, 5816

mstrong, A. H. *See* Allred, J. C., 911, 1114, 7185

mstrong, G. T., Brickwedde, F. G. and Scott, R. B. The vapour pressures of the deuteromethanes, 7626

mstrong, H. L. *See* Simpson, J. H., 2455

mstrong, J. R. *See* Caldwell, D. O., 148

nikar, H. J. The "corona pressure" and negative Joshi effect, 4122

nold, J. R. and Sugihara, T. The decay scheme of natural lutetium 176, 5677

nold, S. M. *See* Koonce, S. E., 4468

nous, E. General theory of damping phenomena for non-stationary processes. III. e^4 corrections to the line breadth, 6464

nous, E. and Bleuler, K. General theory of damping phenomena for non-stationary processes. II. Separation of the virtual states. Second order corrections, 6463

roeste, H. Nonadiabatic transitions, 3499. Collisional excitation of F_2O, 5612

ron, A. On Maze counters, 6882

ron, J. *See* Hill, J. J., 2369

rrol, W. J. Apparatus for large-scale production of phosphorus-32, 7116

rsac, J. *See* Alon, I., 8190

rthur, G. R. A note on the approach of narrow band noise after a nonlinear device to a normal probability density, 212

rthur, J. S. *See also* Bender, R. S., 270; Hausman, H. J., 1835

rthur, J. S., Allen, A. J., Bender, R. S., Hausman, H. J. and McDole, C. J. Energy levels in light nuclei, 1834

rtman, J. O. and Tannenwald, P. E. Measurement of permeability tensor in ferrites, 8548

rtmann, K. Under what conditions is interference double refraction [Interferenzdoppelbrechung] of cathode- and X-rays by crystals observable? 4825

rtom, M., Garelli, C. M. and Gentile, C. Application of interference filters to photometry and colorimetry, 8327

rvin, M. J. Thermoelectric effects in molybdenum disilicide, 4112

rzeliès, H. On the mean velocity of propagation of the energy in an heterogeneous absorbing ionized medium with slowly varying parameters, 337. On the differential equation of electromagnetic rays in a heterogeneous absorbing ionized medium of slowly varying parameters, 3456

rzhanykh, I. S. Solutions of fundamental problems in field theory, 5291. Integral representation of the field vector, 6456

sanuma, M. and Miyahara, S. The coercive force of carbon steel and Néel's theory, 3429

saro, F. and Perlman, I. The alpha-particles of radium, 400. The alpha-spectra of Pu^{239} and Pu^{240}, 1063. Patterns in alpha spectra of even–even nuclei, 8654*

schenbrand, L. M. *See* Zelikoff, M., 176, 3535

scoli, G. Mass of cosmic-ray mesons at mountain altitudes, 6123

scoli, R. Non-local interactions—Compton effect example, 7438. A device for the stabilization of photomultipliers, 7743. The detection of particle showers by means of scintillation counters, 7767. Non local interactions—comparison between various formulations, 8226

sher, H. A variable prism unit for range finders, 1485

shmore, P. G. *See* Chanmugam, J., 2006

shour, A. A. The induction of electric currents in a uniformly conducting circular disk by the sudden creation of magnetic poles, 4221

Aslakson, C. I. New determinations of the velocity of radio waves, 336

Aspden, H. A method of measuring the magnetic permeability of rod specimens, 312

Assmus, F. and Pfeiffer, F. Resistance anomalies of a highly permeable nickel–iron–molybdenum alloy, 2442

Astbury, J. P., Buchanan, J. S., Chippindale, P., Millar, D. D., Newth, J. A., Page, D. I., Rytz, A. and Sahiar, A. B. The mean life of charged *V*-particles, 4384

Astbury, J. P., Buchanan, J. S., James, G. D., Millar, D. D., Newth, J. A., Page, D. I., Sahiar, A. B. and Rytz, A. A neutral *V*-particle from a low-energy nuclear interaction, 5718

Astbury, J. P., Chippindale, P., Millar, D. D., Newth, J. A., Page, D. I., Rytz, A. and Sahiar, A. B. On the decay of charged *V*-particles, 1931

Astoin, N. and Vodar, B. Method of photographic spectrophotometry in the far ultraviolet, 7555. Thin transparent films in the far ultraviolet, 7582

Aston, J. G. and Moessen, G. W. The normal boiling points of oxygen on the thermodynamic scale, 6002

Asundi, R. K. and Appalanarasimham, H. Spectral studies of ozoniser discharges in nitrogen, 735. Effect of irradiation on the intensity distribution of the second positive nitrogen bands in a nitrogen ozonizer, 2331

Asundi, R. K. and Bhattacharya, B. N., Jr. The emission bands of aniline, 3991

Asundi, R. K., Bhattacharya, B. and Appalanarasimham, N. The blue bands of benzaldehyde, 4011

Asundi, R. K., Jr. Anomalous effective rotational temperature of HgH bands, 120

Asunmaa, S. K. *See* Lepsius, R., 6186

Ataka, Y. On the exchange current, 47

Aten, A. H. W., Jr. *See also* Ververk, B., 3550

Aten, A. H. W., Jr and Boelhouwer, M. Gamma-rays from cadmium 117, 4318

Aten, A. H. W., Jr, Cerfontain, H., Dzcubas, W. and Hamerling, T. Observations on neutron-deficient rhodium isotopes, 3584

Aten, A. H. W., Jr, de Wijs, H. and Boelhouwer, M. The decay of gallium 65, 5004

Atherton, E. Determination of size of particles with the electron microscope, 4413

Atkins, K. R. Heat pulses in liquid helium II below 1°K, 3260

Atkins, K. R., Findlay, J. C., Lovejoy, D. R. and Watson, W. H. A method of concentrating He^3–He^4 mixtures, 6007

Atkinson, W. R. *See* Fowler, R. G., 251

Atoji, M. *See also* Sasada, Y., 2087; Zaslow, B., 7328

Atoji, M. and Lipscomb, W. N. The molecular structure of B_4Cl_4, 2600. The crystal and molecular structure of B_4Cl_4, 8103

Atoji, M., Watanabé, T. and Lipscomb, W. N. The X-ray scattering from a hindered rotator. II, 8069

Atterling, H. and Thulin, S. Beta-spectrum of arsenic-71, 7086

Aubry de Puymorin, R. d'. *See* d'Aubry de Puymorin, R.

Auer, P. L. The correlation of solid metal and non-electrolyte solubilities, 5894

Auerbach, R. Internal pressure, 3898

Aughtie, F. The primary load standard, 2978

Auluck, F. C. and Kothari, D. S. Fermi's theory of nuclear collisions and the zero-point energy of pions, 7169

Aumont, R. *See* Romand, J., 7666

Auriol, A. A new method of determining the aerodynamic characteristics of projectiles in a wind tunnel, 663

Aurivillius, B. The structure of Bi_2NbO_5F and isomorphous compounds, 2082

Austern, N. Limit on repulsive core from 100-MeV deuteron photoeffect, 1915. Validity of Born approximation in stripping, 2199

Auty, R. P. *See* Baker, E. B., 3292

Avčin, F. The unit dimensionally consistent with temperature, 6692

Averbach, B. L. *See* Rudman, P. S., 5731; Warren, B. E., 486

Avery, D. G. The optical constants of lead sulphide, lead selenide and lead telluride in the $0{\cdot}5$–$3\ \mu$ region of the spectrum, 3093
Avery, E. C. *See also* Smaller, B., 356
Avery, E. C. and Grossweiner, L. I. Thermoluminescence of ice, 3175
Avignon, P. Study of Zn^{65} by proportional counter, 7871. *See also* Deschamps, Y., 4320
Avignon, Y. *See* Morand, M., 3414
Awatani, J. On the acoustic radiation pressure on a circular disc, 700. The moment of Rayleigh disc by the high frequency sound wave, 701. The genuine anomalous action and the displacement law of Rayleigh disc, 702
Axon, H. J., Hellawell, A., Poole, D. M. and Hume-Rothery, W. A note on temperature control during lattice spacing measurements, 8071
Axon, P. E. and Geddes, W. K. E. The calibration of disc recordings by light-pattern measurements, 5368
Axworthy, A. E., Jr. *See* Benson, S. W., 3681
Ayant, Y. Calculation of the size of the nuclear paramagnetic absorption band in a liquid, 3434. Theory of spin-medium broadening in quadrupole resonance, 7037. A study of spin-spin coupling in the quadrupole resonance of nitrogen, 7824
Ayant, Y. and Buyle-Bodin, M. Study of the quadrupole resonance line of *p*-dichlorobenzene, 5637
Aynard, R. The widening with increasing temperature of the Raman bands of water in gypsum, 7595
Azimov, S. A., Birger, A. G., Polynov, V. N. and Slavatinskiĭ, S. A. Nature of the penetrating particles in electron-nuclear showers, 7757
Azimov, S. A., Lyubimov, A. L. and Rȳzhkova, K. P. On the absorption of particles generating electron-nucleon showers, 8497
Azimov, S. A., Vishnevskiĭ, V. F. and Rȳzhkova, K. P. On electrons produced in the decay of fast mesons, 5714

Babcock, H. D. *See* Babcock, H. W., 3804
Babcock, H. W. and Babcock, H. D. Mapping the magnetic fields of the sun, 3804
Babcock, H. W. and Burd, S. The variable magnetic field of α^2 Canum Venaticorum, 2158
Babcock, M. L., Holshouser, D. F. and Von Foerster, H. Diode characteristic of a hollow cathode, 8475
Babelay, E. F. and Smith, L. A. A needle valve type of variable gas leak for mass spectrometers, 6865
Bachman, C. H., Hall, G. L. and Silberg, P. A. Positive and negative ions in cathode-ray tubes, 4171
Bachofer, C. S. A device for high-intensity, vacuum-irradiation of small samples at controlled temperatures, 2104
Back, F. G. A new approach to the evaluation of the performance of photographic lenses, 8157
Backus, M., Lord, J. J. and Schein, M. Multiple Coulomb scattering of high energy pions in photographic emulsions, 1940
Bacon, G. E. and Lonsdale, K. Neutron diffraction, 3626
Bacon, G. E. and Roberts, F. F. Neutron diffraction studies of magnesium ferrite-aluminate powders, 8116
Bacon, G. E., Street, R. and Tredgold, R. H. The antiferromagnetic properties of mixed cobalt and manganese oxides, 4907
Bacon, R. H. The "best" straight line among the points, 7380
Bade, W. L. Relativistic rocket theory, 3891
Bader, F. Ferromagnetism in the iron group, 6934
Baenziger, N. C. *See* Sanderson, M. J., 8099
Baer, P. and Miescher, E. NO, NO^+ and N_2^+ emission spectra in the Schumann region, 4705
Baer, W. and Bayard, R. T. A high sensitivity fission counter, 3622
Baerg, A. P. Neutron capture cross section of Em^{222}, 7150
Baertschi, P., Kuhn, W. and Kuhn, H. Fractionation of isotopes by distillation of some organic substances, 7854
Baerwald, H. G. and Berlincourt, D. A. Electromechanical response and dielectric loss of pre-polarized barium titanate under maintained electric bias. I, 6562
Baez, A. V. A study in diffraction microscopy wi special reference to X-rays, 174
Bagaryarskiĭ, Yu. A. Natural ageing of aluminiu alloys, 7979
Bagchi, S. N. *See* Hosemann, R., 5781, 7310, 8076–7
Bagdȳk'yants, G. O. An industrial model of t EM-4 electronograph, 8444
Bagley, E. *See* Long, F. A., 8271
Bahn, R. and Böttger, O. The refractive index an thickness of thin anodically formed aluminium oxi films, 8309
Bahner, K. and Miczaika, G. R. A device for t transformation of calibration curves of photoelectr plate photometers, 5833. The colour-luminosi diagram for the Coma Berenices star cluster, 5842
Bähnisch, I., Huster, E. and Walcher, W. On t half-life and decay scheme of Rb^{87}, 1058
Bailey, E. A., Jr and Rollefson, G. K. The dete mination of the fluorescence lifetimes of dissolve substances by a phase shift method, 7590
Bailitis, E., Hagen, C. and Rust, H. H. Experimen on the partial changes of magnetostriction [in ferr magnetic media], 6157
Bainbridge, K. T. *See also* Kraushaar, J. J., 5002
Bainbridge, K. T., Goldhaber, M. and Wilson, Influence of the chemical state on the lifetime of nuclear isomer, Tc^{99m}, 4985
Baines, W. D. *See* Rouse, H., 6705
Bair, E. J. *See also* Innes, K. K., 3496
Bair, E. J., Cross, P. C., Dawson, T. L., Wilson, E. A Jr and Wise, J. H. A kinematically focuse concave-grating spectrometer, 7551
Bair, E. J., Lund, J. T. and Cross, P. C. Chemic modulation: a method for investigating transien molecules, 5765
Bair, J. K. *See also* Kington, J. D., 3537; Willar H. B., 6226
Bair, J. K., Kington, J. D. and Willard, H. B. N level structure from the $C^{13}(p, n)N^{13}$ reactio 5060
Baird, D. C. and Boyle, W. S. A method of dete mining electrical resistivities at low temperature 7665
Bak, B. *See also* Andersen, F., 3137
Bak, B., Bruhn, J. and Rastrup-Andersen, J. Micr wave spectrum and structure of SiD_3F, 471 Microwave spectrum and structure of SiD_3Cl, 471
Bak, B. and Rastrup-Andersen, J. Microwave i vestigation of pyridine, 7573
Baker, E. B., Auty, R. P. and Ritenour, G. J. Dipo loss in polystyrene and derivatives, 3292
Baker, J. M. and Bleaney, B. Nuclear spin of vana dium 50, 2615
Baker, J. M., Bleaney, B., Bowers, K. D., Shaw P. F. D. and Trenam, R. S. Nuclear spin and mag netic moment of radioactive cobalt 57, 4280
Baker, P., Jr and Waltner, A. Angular distributio of neutrons from the *d-d* reaction, 1911
Baker, R. G. *See also* Katz, L., 7138
Baker, R. G. and Katz, L. Absolute beta counting thick planar samples, 4310
Baker, S. C. *See* Walker, W. G., 8757
Baker, W. G. and Martyn, D. F. Conductivity of th ionosphere, 2099
Bakhshi, N. N. *See* Parthasarathy, S., 6557
Balashek, S. *See* Davis, K. H., 1473
Balashova, B. M. *See* Sharvin, Yu. V., 5479
Balasubrahmanyam, V. K. *See* Rao, A. S., 7777
Balazs, N. L. Do Heisenberg's uncertainty relatio prevent Maxwell's demon from operating, 530 The energy-momentum tensor of the electromagneti field inside matter, 7435. The effect of the [type o statistics upon Maxwell's demon, 7472
Baldet, F. Photographic photometry of comets, 6393
Baldin, A. M. and Mikhaĭlov, V. V. On the angula distributions of photomesons produced in nucle 5703. Photoproduction of π°-mesons on deuteron 5721
Baldinger, E. *See* Haeberli, W., 4885; Hahn, B 5046; Zbinden, R., 6604
Baldock, G. R. Determination of the surface energ of a metal by molecular orbitals, 3479
Balkanski, M. Influence of polyvinyl alcohol (Rhod viol BS 100) on the overvoltage of Cu in a solution $CuSO_4$, 5757

ALLARD, L. A. T. Coloured "Perspex" for darkroom lights, 1539

ALLARD, S. S., COMBES, L. S. and MCCARTHY, K. A. A comparison of the physical properties of barium fluoride and calcium fluoride, 489

ALLARIO, M. C. Physical and spatial characteristics of stars with $V \geqslant 40$ km/sec. Longitudinal effect for a group of stellar velocities, 6431

ALLINGER, H. A. *See* JAQUES, T. A. J., 1159, 4398

ALLINI, R. Contribution to the experimental study of nuclear isomerism, application of the method of delayed coincidences to research and to the study of metastable states of short period, 7063. *See also* KOICKI, S., 7069

ALLINI, R. and BERTHELOT, A. Interpretation of experimental results obtained by the method of delayed coincidences, 5671

ALLUFFI, R. W. Polygonization during diffusion, 1964

ALLUFFI, R. W. and ALEXANDER, B. H. Development of porosity during diffusion in substitutional solid solutions, 1172

ALWIT, J. S. *See* LAWTON, E. J., 7254

ALZ, D. On the structure of K_2NiF_4, 8105

AMFORD, C. H. and JENKINS, A. D. Studies in polymerization. VI. Acrylonitrile: the behaviour of free radicals in heterogeneous systems, 4457

AMFORD, C. H. and TOMPA, H. On the X-ray diffraction patterns of polymer films, 7976

ANBURY, P. C. Carrier injection and extraction in lead sulphide, 3301

ANBURY, P. C., HENISCH, H. K. and MANY, A. On the theory of the isothermal Hall effect in semiconductors, 6978

ANCIE-GRILLOT, M. and GRILLOT, E. Radiochemical microdosage of chlorine in luminescent zinc sulphide crystals, 8030

AND, W. Low temperature diamagnetism of electrons in a cylinder, 6805. *See also* NELSON, R. A., 1585

AND, W. and NELSON, R. A. Cluster theory of the saturated vapor pressure of helium isotope mixtures, 6008

BANDYOPADHYAY, G. A note on the limiting mass of a rotating white dwarf, 3828. New equation in the affine field laws, 3858

BANERJEA, S. K. *See* FERRIÉ, F., 7619

BANERJI, R. B. Some studies on random fading characteristics, 3460

BANKS, A. A. and RUDGE, A. J. Selenium hexafluoride: dielectric strength and some chemical properties, 4074

BANKS, E. *See* BROUS, J., 8106

BAÑOS, A., JR and GOLDEN, R. K. The electromagnetic field of a rotating uniformly magnetized sphere, 1273

BARANGER, M., DYSON, F. J. and SALPETER, E. E. Fourth-order vacuum polarization, 606

BARASCH, M. L. *See* CALLEN, H. B., 1399

BARBARON, M. and PESTEIL, P. Fluorescence of organic single crystals at low temperatures. I. Tetraphenyl 1144 butadiene 13, 6658

BARBER, C. R. Improvements in the realization of the International Temperature Scale over the range $-182{\cdot}97$°C to $630{\cdot}5$°C, 3265

BARBER, W. C., BECKER, G. E. and CHU, E. L. Electron-electron scattering at 6·1 MeV, 3358

BARBIER, D. Photometry of the u.v. region of the light of the night sky, 4512. An approximate solution of a problem of transfer, and its application to the determination of corrections for diffusion in photometric measures of the night-sky light, 5249. A comparison of spectra of comets and of the earth's upper atmosphere, 6418. Photometric study of the u.v. region of the night-sky light, 7360

BARBIER, M. The practical calculation of third-order aberrations in the centred systems of electron optics, 7716

BARCHEWITZ, P. The (OH) absorption bands of phenol between 1100 and 1400 cm^{-1}, 7568. *See also* AMAT, G., 7581; CASSANAS, F., 895; GRENIER-BESSON, M. L., 3138

BARCHEWITZ, P., TATIBOUËT, F. and SOUCHAY, P. Vibration frequencies of the carbonyl group of quinone and its derivations, 6999

BARCLAY, C. and SOGN, L. T. Reference data for orienting quartz plates by X-ray diffraction, 8781

BARCLAY, F. R. and WHITEHOUSE, W. J. The average number of neutrons emitted in the spontaneous fission of ^{242}Cm, 7082

BARDEEN, J. *See* BRATTAIN, W. H., 1637

BARDÓCZ, A. Electronically controlled spectrographic spark source, 6599

BARDÓCZ, A. and KEMÉNY, Á. Electronic spark timing device, 638

BARENDSEN, G. W. *See* DE VRIES, H., 2503, 3764

BARER, R. The contrast effect of thick objects in phase microscopy, 788. A comprehensive vector theory of phase-contrast and interference contrast, 3203. Infrared phase-contrast microscopy, 3212. Phase-contrast and interference microscopy of birefringent objects, 3219. A new method of light microscopy, 5431

BARFIELD, W. D. and BROYLES, A. A. Coulomb functions for heavy nuclear particles, 633

BARGMANN, V. On the number of bound states in a central field of force, 2208

BARINSKIĬ, R. L. X-ray absorption spectra of molybdenum in the compounds $(NH_4)_2MoO_4$, $K_4Mo(CN)_8$ and MoS_2, 5502. *See also* NARBUTT, K. I., 5505, 5508; VAĬNSHTEĬN, É. E., 5506, 6071

BARINSKIĬ, R. L., VAĬNSHTEĬN, É. E. and NARBUTT, K. I. Use of the magnitude of the jump in the coefficient of X-ray absorption for the calculation of the fine structure of the fundamental edge, 5504. The structure of the X-ray absorption edge of atoms of transition elements in chemical compounds, 5507

BARKAS, W. H. The range correction for electron pick-up, 3371. *See also* SMITH, F. M., 8700; WILSON, H. W., 2686

BARKAS, W. H. and TYREN, H. Physical analysis of Be and C disintegration induced by 330-MeV protons, 1906

BARKER, J. A. Co-operative orientation effects in solutions, 65. Methods of approximation in the theory of regular mixtures, 3009. Statistical mechanics of interacting dipoles, 7473. Co-operative orientation in solutions. The accuracy of the quasi-chemical approximation, 7501

BARKER, J. R. and DAVIES, R. O. A calculus of measures and its application to the relation between rationalized and unrationalized electromagnetic systems, 3846

BARKER, K. H. *See also* ARMENTEROS, R., 7956

BARKER, K. H., BUTLER, C. C., SOWERBY, M. G. and YORK, C. M. The mean lifetime and frequency of production of charged *V*-particles, 1930

BARKER, K. H., SARD, R. D. and SOWERBY, M. G. The use of neutron counters to obtain cloud-chamber photographs of *V*-particle decays, 4196

BARKER, R. S. and EYRING, H. A study of three-center integrals useful in molecular quantum mechanics, 5623

BARKER, W. A. and CHRAPLYVY, Z. V. Conversion of an amplified Dirac equation to an approximately relativistic form, 2192

BARKLA, H. M. and FINLAYSON, D. M. The properties of KH_2PO_4 below the Curie point, 4073

BARKOW, A. G. *See* MOFFETT, J. C., 549

BARLOUTAUD, R. and LÉVÊQUE, A. Measurement of the ratio of the activation cross-section of manganese and the fission cross-section of uranium for thermal neutrons. Redetermination of the Chatillon neutron density standard, 1139

BARLOUTAUD, R. and SARTORY, M. On the [level] scheme of $^{75}_{33}As$, 7072

BARLOW, H. M. and KARBOWIAK, A. E. An investigation of the characteristics of cylindrical surface waves, 2566. Proposed use of a cylindrical surface wave resonator for the determination of the velocity of short electromagnetic waves, 6581

BARNARD, G. P. Modern mass spectrometry, 4152

BARNARTT, S. Calculation of the temperature and pressure coefficients of conductivity and the ultrasonic effect in dilute electrolytes from Onsager's theory, 7241

BARNES, A. H. Direct-current electromagnetic pumps, 5580

BARNES, C. *See* ANDERSON, D. V., 5346

BARNES, C. A., JAMES, D. B. and NEILSON, G. C. Angular distribution of the gamma rays from the reaction $N^{15}(p, \alpha\gamma)C^{12}$, 7130

Barnes, C. B. *See* Heer, C. V., 8377
Barnes, G. *See* Dyke, W. P., 6834
Barnes, R. G. *See* Harrick, N. J., 5655
Barnes, R. S. The sintering of powders and diffusion, 3628
Barnett, C. F. *See also* Evans, G. E., 6099
Barnett, C. F., Stier, P. M. and Evans, G. E. Pig ion source, 6104
Barnett, S. J. Gyromagnetic ratios of microcrystalline and macrocrystalline materials, 4917
Barnett, S. J. and Giambomi, I. A. A new gyromagnetic effect in Permalloy and iron, 329
Baroncini, D. The non-adiabatic method with a neutral pseudo-scalar meson field, 7449
Baroni, G., Cortini, G., Milone, A., Scarsi, L. and Vanderhaege, G. Study of the soft component of the cosmic radiation at Pic du Midi, 8485
Barr, A. E. De. *See* De Barr, A. E.
Barrell, H. The interferometry of length, 2971
Barret, P. Pulverizability and surface structure of electrolytic solutions, 7250
Barrett, P. H., Bollinger, L. M., Cocconi, G., Eisenberg, Y. and Greisen, K. Interpretation of cosmic-ray measurements far underground, 1731
Barrett, P. H., Cocconi, G. and Eisenberg, Y. Search for "*T*-tracks" in photographic plates, 2883
Barrett, P. T. The electric collection of radioactive ions of bromine, technetium and indium, 6900
Barrett, W. A. *See* Cook, C. J., 8454
Barriault, R. J. *See* Beattie, J. A., 75–6
Barrow, G. M. Heat capacity, gas imperfection, infrared spectra, and internal rotation barriers of ethyl alcohol, 822. The infrared spectra of oriented rhombic sulfur crystals with polarized radiation, 2339
Barrow, R. F. *See also* Laird, R. K., 8317; Rowlinson, H. C., 4008, 4699, 7564
Barrow, R. F. and Caunt, A .D. The $^2\Sigma_+ - {}^2\Pi i$ band system of HBr$^+$, 6614. The ultra-violet absorption spectra of some gaseous alkali-metal halides and the dissociation energy of fluorine, 6641
Barrow, R. F., Caunt, A. D., Downie, A. R., Herman, R., Huldt, E., McKellar, A., Miescher, E., Rosen, B. and Wieland, K. Atlas of characteristic wavelengths of emission and absorption bands of diatomic molecules, 3992
Barrow, R. F., Drummond, G. and Garton, W. R. S. Ultra-violet bands associated with germanium, 4001
Barschall, H. H. Methods for measuring fast neutron cross sections, 1152. *See also* Coon, J. H., 1137; Walt, M., 6240
Barson, F. *See* Legvold, S., 8554
Bartél, A. *See* Craig, R., 2321
Bartell, L. S. and Brockway, L. O. The investigation of electron distribution in atoms by electron diffraction, 6184. The calibration of photographic emulsions for electron diffraction investigations, 6360. Investigation of nuclear motion by electron diffraction, 8449
Bartenev, G. M. On the theory of deformation of rubber, 6261
Barteneva, O. D. *See* Pinegin, N. I., 5821
Barthès, E. *See* Tarnay, F., 785
Bartholomew, E. L., Jr, Krystyan, K. J., Millar, D. A. J. and Wulff, J. A machine for tensile testing at controlled temperatures and constant true strain rates, 3666
Bartholomew, G. A. *See also* Kinsey, B. B., 2670, 5039, 5690, 7892
Bartholomew, G. A. and Kinsey, B. B. Further measurements on the γ rays produced by neutron capture in beryllium and carbon, 1893. Neutron capture γ-rays from scandium, vanadium, manganese, cobalt, and copper, 2671
Bartholomew, R. M., Brown, F., Hawkings, R. C., Merritt, W. F. and Yaffe, L. The fission yield of I^{131} in the thermal neutron fission of U^{235}, 5091
Bartholomew, R. M., Brown, F., Howell, W. D., Shorey, W. R. J. and Yaffe, L. The design of an automatic recording electroscope and its use to determine half-lives in radioactive decay, 7062
Bartholomew, R. M., Hawkings, R. C., Merritt, W. F. and Yaffe, L. Thermal neutron capture cross-section of Na^{23} and Mn^{55}, 5086
Bartlett, J. H. Iterative procedures and the helium wave equation, 1039
Bartlett, J. H. and Dienes, G. J. Combined pairs vacancies in copper, 3476
Bartlett, J. H. and Stephenson, L. Anodic behavi of iron in H$_2$SO$_4$, 7251
Bartlett, M. S. On the statistical estimation of me life-times, 4385. Recurrence and first passage tim 5832
Barton, J. C. East–west asymmetry of moderate-ener neutrons in the cosmic radiation, 3417
Barton, R. *See* Kip, A. F., 2537*
Barwell, F. T. The effect of lubrication and nature superficial layer after prolonged periods of runnin 4400
Bashilov, A. A., Anton'eva, N. M. and Dzhelepo B. S. The β-spectrum of Ir^{192}, 5684
Basile, R. Exchange forces in the causal interpretatio 6472. Exchange forces in causal theory. Limits validity for the notion of exchange energy, 6473
Basinski, Z. S. and Christian, J. W. The martensit transformation in cobalt, 8765
Baskir, E. *See* Oxley, C. L., 7730
Baskova, K. and Kudryavtseva, A. The half life P^{30}, 3543*
Bass, A. M. The optical absorption of sulfur, 2356
Bass, A. M. and Benedict, W. S. A new infra-red ban system of FeO, 3993
Bass, A. M. and Broida, H. P. Effects of vibration state on rotational intensity distributions in OH, 31
Bassi, P. and Bianchi, A. M. Technical questions on t Cherenkov radiation counters. I, 8471
Bassi, P., Bianchi, A. M., Cadorin, D. and Manduc C. Zenithal distribution of extensive show particles, 7770
Bassi, P., Bianchi, A. M. and Manduchi, C. On t photon component of extensive air showers, 172 Intensity measurement of Cerenkov light, 8504
Bassi, P., Manduchi, C. and Veronesi, P. The zenith distribution of the medium energy nucleonic con ponent, 7760
Bassompierre, A. Nuclear quadrupole resonance HgCl$_2$, 4950. Nuclear quadrupole resonance CH$_2$ClCO$_2$H, 5632. Nuclear quadrupole resonan of boron, 8620
Bastiansen, O. *See* Andersen, F., 3137
Bastin-Scoffier, G. and Sant'ana-Dionisio, J. On t energies of the α-radiation of radium and of some the radioelements of the Ra and RaTh families, 50
Basu, D. Pseudoscalar meson field and relativist scattering of neutrons by protons, 3879
Batchelor, G. K. The theory of homogeneous turbu lence, 7487
Batchelor, R. and Flowers, B. H. A new method measuring angular distributions, 5537
Bateman, J. B. *See* Hartman, R. E., 2762
Bates, C. J. *See* Davison, S., 8649
Bates, D. R. Vibration spectrum of N^{14}N^{15}, 3995
Bates, D. R. and Dalgarno, A. Electron captur I. Resonance capture from hydrogen atoms by fas protons, 1904
Bates, D. R., Massey, H. S. W. and Stewart, A. Inelastic collisions between atoms. I. Genera theoretical considerations, 4177
Bates, D. R. and Poots, G. Properties of the hydroge molecular ion. I. Quadrupole transitions in th ground electronic state and dipole transitions of th isotopic ions, 8619
Bates, L. F. and Hart, A. A comparison of the powde patterns on a sample of grain-oriented silicon-iro with those obtained on a single crystal, 8549
Bates, L. F. and Marshall, G. Heat effects in th magnetization of silicon iron, 8573
Bates, L. F. and Martin, D. H. Domains of revers magnetization, 3440
Bates, L. F. and Sherry, N. P. R. Thermal effect accompanying magnetization of a ferrimagneti material, 8579
Bates, L. F. and Wilson, G. W. A study of bitte figures on the (110) plane of a single crystal of nicke 8550
Battat, M. E. and Ribe, F. L. Formation of He^6 b 14-MeV neutron bombardment of Li and Be, 1922
Battey, J., Madansky, L. and Rasetti, F. The alph gamma angular correlation in radiothorium, 1878
Battig, A. On the limiting concept of trajectory of particle, 99

AUTHOR INDEX

el, R. E., Crane, W. W. T. and O'Kelley, G. D. The excitation function for the $Al^{27}(d, \alpha p)Na^{24}$ reaction, 7923
et, J. *See* Pullman, B., 3504
r, E. and Wu, T.-Y. A quantum-mechanical calcu-ation of the rates of some chemical reactions, 4443
r, F. L. Tensors whose elements are Dirac matrices, 613
han, E. C. Vibration frequencies in diatomic nolecules and in solid metals, 4941
n, R. M. and Hung, C. S. Activation energy of heat treatment introduced lattice defects in germanium, 223
ann, K. Report on the recent development of quantum electrodynamics. II–III, 2186. On the definition of relativistic particle-antiparticle wave-functions, 5304. A simple derivation of the scattering formula of Bhabha, 5519
gardt, E. The visual mechanism and the quantal structure of light, 1306
igartner, E. and Huber, P. Proof of the polarization of (*d*, *d*) neutrons through scattering by carbon, 3705
igartner, W. *See* Schaetti, N., 6790
iinger, R. *See* Cohen, S. G., 3541
, H. *See* Kortüm, G., 768
er, S. and Vodden, H. A. The construction of a liquid dielectrics test cell, 829
Z., Cleland, M. R. and McLernon, F. Fast coincidences with Čerenkov counters, 282
rd, R. T. *See* Baer, W., 3622
r-Helms, F. and Pick, H. The Coriolis force on a sphere in a liquid, 6517
t, M. Electromagnetic properties of plasmas, 1668
t, M. and Dumas, G. On the operation of the Penning gauge, 6542
y, J. G. An experimental study of a divergent nuclear reactor, 2733
r, J. and Karp, S. N. Propagation of plane electromagnetic waves past a shoreline, 4933
ulin, P. A. *See* Egorov, Yu. P., 7594
h, A. L. *See* Lander, J. J., 1174
s, M. D. and Linz, A., Jr. Ceramic insulation, 828
s, J. W. *See* Davisson, C. J., 8577
, B. R. The geographical and height distribution of the gradient of refractive index, 5256
d, C. I. *See also* Yost, W. J., 3762
d, C. I. and Bianco, D. R. Two D_2O microwave absorption lines, 134
tie, J. A., Brierley, J. S. and Barriault, R. J. The compressibility of krypton. I. An equation of state for krypton and the weight of a litre of krypton, 75. The compressibility of gaseous krypton. II. The virial coefficients and potential parameters of krypton, 76
tie, J. A., Douslin, D. R. and Levine, S. W. The compressibility of and an equation of state for gaseous neopentane, 74
jard, L., Collette, G. and Jacqué, L. Methods of investigating reactions between gases and solids. Application to the iron-carbon-hydrogen system, 2776
mont, C. F. A. *See* Reekie, J., 6250
regard, O. Costa de. *See* de Beauregard, O. Costa
ssier, J. and Couchet, G. On the study with a mass spectrometer of the ionic emission of alumino silicates, 6911
rt, M. *See* Roig, J., 3338
erer, G. The structure of lustrous carbon layers, 3713
ert, K. Contributions to a non-linear electrodynamics. II, 35
mann, R. Thickness vibrations of piezoelectric crystal plates, 2439. The linear piezoelectric equations of state, 6763. The establishment of the orientation of crystal plates and the associated transformation of co-ordinates, 8759
, A. H. and Brisbane, A. D. A cylindrical magnetron ionisation gauge, 6541
, C. J., Lovell, D. J. and Hulbert, E. O. Atmospheric attenuation at Khartoum, Sudan, 6332
, F. On the phenomenological theory of superconductivity. (Remarks on a paper of the same title by H. Koppe), 3314. The energy-momentum tensor in the phenomenological theory of superconductivity, 6059. The general validity of Planck's formulation of the law of the inertia of energy, 6149
Beck, G. Remarks on the theory of an effect reported by M. Robert Lennuier, 4678
Beckenbach, E. F. [Ed.]. Construction and applications of conformal maps, 2891
Beçker, E. W. and Bier, K. The chemical isotope separation method [treated] as a rectification problem, 2627
Becker, E. W., Bier, K., Scholz, S. and Vogell, W. Performance of chemical exchange plant for the enrichment of C^{13}, 2628
Becker, E. W., Misenta, R. and Stehl, O. Difference in viscosity of *ortho-* and *para*-deuterium at low temperatures, 6511
Becker, E. W. and Stehl, O. A viscosity difference between ortho and para-hydrogen at low temperatures, 4633
Becker, F. Warming of the stratosphere by solar eruptions (advance communication), 7357
Becker, G. E. *See* Barber, W. C., 3358
Becker, J. *See* Price, B. T., 3407
Becker, R. The effective mass of a Bloch wall, 1743
Becker, R. A. *See* Bendel, W. L., 6184; Brown, H. N., 5693
Becker, R. L. *See* Walt, M., 4366
Becker, R. S. and Sheline, R. K. Preliminary experiments using Mg^{28} as a tracer with chlorophylls, plants, and their extracts, 7118
Becker, U. A relationship between geomagnetic disturbance and the distribution of sunspots, 8191
Becker, W. Separation of giant and dwarf stars by means of 3-colour photometry, 5843
Beckey, H. D. and Groth, W. E. A new method for the enrichment of isotopes in the transition range between Knudsen- and Poiseuille-flow, 1040
Beckman, O., Huus, T. and Zupančič, Č. Excitation curves for α particles from B^{11} bombarded with protons, 7917
Becquerel, J. and Couderc, P. On the displacement of galactic spectral lines and the Hubble–Humason law. Comparison with Lemaître's theory, 5271. On some consequences of the expansion of the universe in the exploration of space, 5272
Beers, Y. *See* Gindsberg, J., 8585
Beeskow, H. *See* Schubert, K., 8097
Beevers, C. A. and De Barr, A. E. [Conf. rep.]. Summarized proceedings of a conference on X-ray analysis—Edinburgh, April, 1952, 1253
Beevers, C. A., McDonald, T. R. R., Robertson, J. H. and Stern, F. The crystal structure of sucrose, 553
Begemann, F., v. Buttlar, H., Houtermans, F. G., Isaac, N. and Picciotto, E. Application of the RaD method to the determination of the "chemical" age of a uranium mineral, 1047
Beghian, L. E. *See also* Hicks, D., 5058
Beghian, L. E., Halban, H. H., Husain, T. and Sanders, L. G. Energy levels of C^{12} from the $Be^9(\alpha, n)C^{12}$ reaction, 7076
Behr, A. *See also* Siedentopf, H., 1283, 5836
Behr, A. and Siedentopf, H. The structure of zodiacal light, 5276. An examination of the zodiacal light and gegenschein from photoelectric measurements at the Jungfraujoch, 5835
Behrens, D. J. The statistical significance of counts differing only slightly from the mean background level, 4169
Beiser, A. Nuclear emulsion technique, 2880
Bekefi, G. Diffraction of electromagnetic waves by an aperture in an infinite screen, 1776. Diffraction of sound waves by a circular aperture, 3062
Békésy, G. v. *See* v. Békésy, G.
Bélanger, L. F. Improvements to the melted emulsion technique of autoradiography, 2125
Belcher, E. H. Luminescence of aqueous solutions of radioactive isotopes and the Čerenkov effect, 769. The luminescence of irradiated transparent media and the Čerenkov effect. I. The luminescence of aqueous solutions of radioactive isotopes, 3173. Scintillation counters using liquid luminescent media for absolute standardization and radioactive assay, 6889
Belcher, H. V. *See* Bestul, A. B., 5873, 8038

Belen'kiĭ, S. Z. and Maksimov, B. I. The scattering of cascade particles in heavy elements, 5553
Belikova, T. P. *See* Shalimova, K. V., 5400
Bell, D. A. Current-noise in semi-conductors: a re-examination of Bernamont's data, 1634
Bell, D. A., Cluley, J. C. and Berktay, H. O. Electrical measurement of the cathode temperature of diodes, 940
Bell, D. G., Hum, D. M., Pincherle, L., Sciama, D. W. and Woodward, P. M. The electronic band structure of PbS, 4241
Bell, G. I. The capture and loss of electrons by fission fragments, 5090
Bell, G. M. Second neighbour interaction in regular binary assemblies, 4238
Bell, J. F. W. A fixed path ultrasonic interferometer for absorption measurements on gases, 2297
Bell, J. S. A new focusing principle applied to the proton linear accelerator, 4148. Phase debunching by focussing-foils in a proton linear accelerator, 5523
Bell, J. S. and Bruce, J. M. A semicircular waveguide loaded by a semicircular slotted sheet, 4925
Bell, R. E. *See also* Graham, R. L., 3548, 7067
Bell, R. E. and Graham, R. L. Time distribution of positron annihilation in liquids and solids, 5049
Bell, R. M. and Hill, H. A dissipation factor anomaly, 5463
Bell, W. E. and Hincks, E. P. Lifetimes of the μ^--meson stopped in Li, Be and C, 1936
Bellamy, E. H. and Smith, K. F. The nuclear spins and magnetic moments of ^{24}Na, ^{42}K, ^{86}Rb, ^{131}Cs and ^{134}Cs, 4279
Bellemans, A. Application of the cell method to the statistical thermodynamics of solutions. III. Critical solution phenomena, 3012. Thermodynamical study of the water-triethylamine system near its lower critical point, 3277. *See also* Prigogine, I., 3918
Belli, J. A. *See* O'Brien, J. P., 8824
Belliboni, G. and Vitale, B. Angular distribution of black and grey tracks in stars of average and high energy, 7782
Bellomo, E. and Loinger, A. Physical equivalence of the equations of Dirac–Corben and Dirac, 8228
Belov, N. V. The so-called law of crystallographic symmetry, 5767
Belov, N. V., Butuzov, V. P. and Golovastikov, N. I. The crystal structure of dioptase, 2083
Belov, N. V. and Rumanova, I. M. The crystal structure of epidote, Ca$_2$Al$_2$FeSi$_3$O$_{12}$(OH), 7335
Belyaev, I. N., Novosil'tsev, N. S., Fesenko, E. G. and Khodakov, A. L. The dielectric properties and optical anomalies of single crystals of BaTiO$_3$, 4788. Temperature changes of BaTiO$_3$ single crystals, 5778
Benade, A. H. The mean life of negative μ mesons stopped in iron, 7959
Bendel, W. L., Shore, F. J., Brown, H. N. and Becker, R. A. Disintegration of 24-minute Ag^{106}, 6201
Bender, P. L. and Gorter, C. J. A few remarks on the two-fluid model for superconductors, 2465
Bender, R. S. *See also* Arthur, J. S., 1834; Hausman, H. J., 1835
Bender, R. S., Reilley, E. M., Allen, A. J., Ely, R., Arthur, J. S. and Hausman, H. J. The University of Pittsburgh scattering project, 270
Bendt, P. J. Neutron scattering by coupled paramagnetic ions, 2745. The dependence of paramagnetic neutron scattering on coupling between Mn^{++} ions, 4395
Béné, G.-J. The determination of nuclear moments from radiospectra, 1840. Theory of dipole relaxation. Fundamental formalism, 4791
Béné, G.-J., Denis, P.-M. and Extermann, R.-C. Arrangements for the study of magnetic fields by nuclear magnetic resonance, 4900. Investigation of static magnetic fields by means of nuclear magnetic resonance, 5563. Measurement of magnetic field gradients by nuclear induction [methods], 7786
Benedicks, C. Theory of the lightning-balls and its application to the atmospheric phenomenon called "flying saucers," 2854
Benedicks, C. and Ekelund-Kappeler, B. On the measuring of cohesional forces of solids, as influenced by liquids, 2772
Benedict, T. S. and Shockley, W. Microwave obs tion of the collision frequency of electrons in manium, 4077
Benedict, W. S. *See also* Bass, A. M., 3993; Ply E. K., 2353; Taylor, J. H., 1531
Benedict, W. S., Claassen, H. H. and Shaw, J. Absorption spectrum of water vapor between and 13 microns, 2351
Benedict, W. S., Gailar, N. and Plyler, E. K. vibration-rotation spectrum of D$_2$O, 7575. vibration-rotation spectrum of HDO, 7576
Benedict, W. S., Plyler, E. K. and Humphreys, The emission spectrum of OH from 1·4 to 1 3113
Benel, H. Thermoelectric e.m.f. in a monometal cuit, 6810
Benenson, R. E. Energy levels in N^{14} and C deuteron bombardment of C^{13}, 5063
Benesch, W. and Elder, T. Relative optical col diameters from the pressure broadening of indiv infrared absorption lines, 6612
Bennett, A. H., Jupnill, H., Osterberg, H. Richards, O. W. Phase microscopy (Principles applications), 789
Bennett, J. M. *See* Rank, D. H., 3983, 7571
Bennett, F. D. and Kahl, G. D. A generalized v theory of the Mach–Zehnder interferometer, 23
Bennett, G. S. *See* Clark, R. J., 5979
Bennett, H. S. The electromagnetic transmi characteristics of the two-dimensional medium, 6972
Benoist-Gueutal, P. On the rôle of the atomic trons in α-emission, 1874. Correction to be ap to the theoretical energy-period relation for α- sion due to the presence of the electron cloud, On some effects of the atomic electrons in β- electron-capture disintegrations, 5017. On excitation of atomic electrons by α- and β-emis 7860
Benoit, H. Study of the depolarization of scattered by molecular chains, 5426
Benoit, H. and Goldstein, M. Angular distributi the light scattered by random coils, 5985
Bensey, F. N. *See* Burbank, R. D., 4265
Benson, F. A. The characteristics of some mini high-stability glow-discharge voltage regulator 874
Benson, F. A. and Smith, J. P. Variations in the ch teristics of some corona-stabilizer tubes, 7703
Benson, R. W. The calibration and use of probe microphones, 2292
Benson, R. W. and Hirsh, I. J. Some variables in spectrometry, 5354
Benson, S. W. The induction period in chain reac 499. *See also* Copeland, C. S., 1998
Benson, S. W. and Axworthy, A. E., Jr. A de formulation of kinetic processes. II. The r collision processes, 3681
Bentley, W. *See* Elson, R., 2726
Benton, A. and Inatomi, T. H. The thermody properties of sodium vapor, 1597
Benveniste, J. and Cork, B. Inelastic events induc 32-MeV protons on helium, 2689
Beranek, L. L. Unsolved military noise prob 2301
Beranek, L. L., Reynolds, J. L. and Wilson, Apparatus and procedures for predicting venti system noise, 3069
Berbezier, J. and Lallement, C. Description simplified apparatus for gamma radiosondage for mine survey, 5230
Berchtold, J. and Eggert, J. On the inflammabi explosives by radiation of high intensity, 6295
Berencz, F. *See* Pauncz, R., 1754
Beretta, E., Filosofo, I. and Sommacal, B. vertical and inclined positive excess of μ-m 1712
Berezhiani, V. M. On the phenomenon of recov artificially aged alloys of the type Al–Cu–M duralumin, 7997
Berg, G. J. van den. *See* van den Berg, G. J.
Berg, T. G. Owe. The effect of atomic vibratio the paramagnetism and specific heat [of magnetic metals], 5607

en, J. T. and Patterson, W., Jr. Anomalous viscous flow at very low rate of shear and small shearing stress, 5877
eon, R., Robin, S. and Vodar, B. Statistical theory of the effect of pressure on spectral lines, 119
er, E. R. Comments on "The Dirac delta function and the summation of Fourier series," 6376
er, J., Chalonge, D., Divan, L. and Fringant, A.-M. Spectrophotometric measures of stellar radiation; application to two white dwarfs, 11
er, J., Divan, L. and Fringant, A.-M. An attempt to determine an absolute value of the coefficient of continuous absorption of interstellar matter, 7389
er, M. Dimensions and units, 591
er, M. J. Multiple scattering of fast protons in photographic emulsions, 271
hout, C. W. Increase of the resistivity of some face centered metals by cold-working, 4109
lund, S. *See* Borelius, G., 3660
mann, O. On optics in generalized field theories, 3859. Conservation laws in classical electrodynamics, 4594
mann, P. G. *See also* Goldberg, J. N., 1946
mann, P. G. and Schiller, R. Classical and quantum field theories in the Lagrangian formalism, 2177
mann, P. G. and Thomson, R. Spin and angular momentum in general relativity, 2167. Generalized statistical mechanics and the Onsager relations, 6494
stralh, T. A., Dunning, K. L., Durand, E., Ellison, C. H., Howerton, H. K. and Slavin, W. A portable 250-kilovolt accelerator, 6859
strand, E. On the precision of optical methods for the determination of the velocity of light, 3078
nger, R. *See* Rawson, E. B., 1037
owitz, A. E. *See* Franklin, A. D., 4215
tay, H. O. *See* Bell, D. A., 940
incourt, D. A. *See also* Baerwald, H. G., 6562
incourt, D. A. and Kulscar, F. Electromechanical properties of BaTiO$_3$ compositions showing substantial shifts in phase transition points, 832
incourt, T. G. The de Haas-van Alphen effect in enriched tin isotopes, 327
man, I. B., Lucas, H. F. and May, H. A. The determination of photographic film exposure by neutron activation of Ag^{107}, 6361
ovich, É. E. Investigation of the β-spectrum of RaB, 5685
ian, A. I. Total Compton and pair production cross sections at 19·5 MeV, 4330
ian, R. The thermal conductivity of some polycrystalline solids at low temperatures, 2400. The thermal conductivity of dielectric solids at low temperatures, 4757
ian, R. and Poulter, J. On the latent heat and vapour density of helium, 1586
ial, M. J. M. Analytical wave functions for methane and the ammonium ion, 6992
iard, J.-J. A composite distribution of velocities due to molecular agitation, 4652. Application of polynomial distributions to the determination of the thickness of shock waves, 7511
iard, M. Spherical aberration of gridded lenses, 1676
iard, M. and Jaffray, J. The electrical conductivity and the transformation of magnetite, 3297
iard, M.-Y. Electrostatic lenses for focusing particles of very high energy. Field distribution, 3350. Electron lenses useful for particles of high energy. Calculation of trajectories, 5514. The principles of the theory of motion of ions in linear accelerators, 6855. The influence of variation of amplitude of the accelerating field on the movement of ions in linear accelerators, 7728
iard, R. and Davoine, F. Evaluation of electron images of powdered materials, 5135
iard, R. and Pernoux, E. Interpretation of the structure of electronic images, 2486. Interference fringes obtained by the superposition of two coherent electron beams, 3355. Origin of streaky pictures with thin crystals, 5132
iard, W. J. *See* Haendler, H. M., 4023
Bernardini, G., Booth, E. T. and Lindenbaum, S. J. The interactions of high energy nucleons with nuclei. II, 1106
Bernardini, G., Reitz, R. and Segrè, E. Photomesonic fission of bismuth, 5075
Bernas, R. An electromagnetic separator for isotopes of light and medium elements, 5527. *See also* Faraggi, H., 452; Laberrigue-Frolow, J., 5029; Valladas, G., 7878
Bernas, R. and Beydon, J. The assignment of the 6·7 hr isomeric transition of molybdenum to the isotope of mass 93, 3544
Berne, E. Studies on radioactive bromine, 5674
Bernhart, J. Two applications of the concept of spatial distortion, 721
Bernstein, H. J. and Pullin, A. D. E. Vibration spectra of *cis* and *trans* dichloroethylene-d_1, 3119
Bernstein, R. B. *See also* Decker, C. E., 3120; Pontarelli, D. A., 1804
Bernstein, R. B., Gordus, A. A. and Cleveland, F. F. Substituted methanes. XII. Infrared spectral data for deuterotrichloromethane, 1521
Bernstein, W. *See also* Schwartz, R. B., 7873
Bernstein, W., Chase, R. L. and Schardt, A. W. Gray wedge pulse-height analysis, 6113
Berry, C. E. *See* Washburn, H. W., 5189
Berry, C. R. Electron diffraction from small crystals, 1267. Effect of internal strains on linear expansion, X-ray lattice constant, and density of crystals, 7288
Berry, F. J. The diffraction of sound pulses by an oscillating, infinitely long strip, 3955. The diffraction of a sound-pulse by a non-rigid semi-infinite plane screen, 3956
Berry, R. L. and Raynor, G. V. The crystal chemistry of the Laves phases, 2827
Bersohn, R. Nuclear electric quadrupole spectra in solids, 381
Berstein, I. A., Farmer, E. C., Rothschild, W. G. and Spalding, F. F. Studies on the gamma-radiation induced polymerization of acrylonitrile, 8027
Bertaut, E.-F. X-ray study of the dimensions of the reflecting regions [domaines de Bragg] in polycrystalline powders. I, 2821; II. Application to the study of the texture and structure of pyrophoric iron powders and of their magnetic properties, 7320. Contribution to the study of defect structures: pyrrhotite, 8061
Bertaut, F. The electrostatic energy of ionic networks, 5775. *See also* Delorme, C., 5643
Bertaut, F. and Blum, P. [X-ray] study of some chromium borides, 5215
Bertaut, F. and Delorme, C. Investigation of [the compound] Fe$_5$CuO$_8$, 2541
Bertaut, F. and Durif, A. Existence of a spinal 1 : 4, with mono- and tetravalent cations, 3744
Bertein, F. A method of calculation of trajectories in electron optics. Generalization to linear homogeneous differential equations, 893. Aberrations of electron images of imperfect emitting cathodes, 6842. On the representation of optical or electron lenses by pure resistance quadripoles, 7714
Bertele, H. v. *See* v. Bertele, H.
Berthelot, A. *See also* Ballini, R., 5671
Berthelot, A., Chaminade, R., Levi, C. and Papineau, L. Research on a double *K*-capture in zinc 64, 7089
Berthelot, J., Rérat, C. and Rose, A. J. Charts giving the characteristics of bent-crystal X-ray monochromators, 8070
Berthier, G. LCAO self-consistent field calculations of the π-electrons energy levels and electronic structure of fulvene, 7009. *See also* Pullman, B., 3504
Berthier, P. Variations in the intensity of the oxygen lines λ 6300 Å and λ 6364 Å during the morning and evening twilight, 7358. On the emission of near infrared OH and O$_2$ bands in the twilight and night sky, 7359
Berthold, R. Measurement of the thickness of nonferromagnetic layers on nonferromagnetic support with beta rays and Geiger counter, 5311
Berthold, R. and Trost, A. A counter tube arrangement for X-ray measurements, 2073
Berti, L. Data for the design of a birefringent filter, 2361
Bertolini, F. Luminous trajectories in a transparent space. Existence of unilluminated regions, 4684

Bertolini, G., Bettoni, M. and Bisi, A. Total ionization by *α*-particles from polonium in argon and nitrogen, 7881
Bertolini, G. and Bisi, A. A low-capacity ionization chamber, 7740
Bertolini, G., Cini, M., Colombino, P. and Wataghin G. Multiple production of mesons in penetrating showers, 1730
Besdin, D. J., Shewell, J. R. and Ikenberry, E. The motion of a conducting sphere in a uniform magnetic field, 7787
Beshidze, V. L. Concerning the exchange interaction of the external and internal electrons in ferromagnetism, 4901
Bessis, M. and Locquin, M. Phase-contrast microscopy applied to cytology. A comparison of techniques and apparatus, 3226
Best, A. C. The evaporation of raindrops, 4506
Bestul, A. B. and Belcher, H. V. Temperature coefficients of non-Newtonian viscosity at fixed shearing stress and at fixed rate of shear, 5873. Degradation of polyisobutylenes on shearing in solution, 8038
Bethe, H. A. Molière's theory of multiple scattering, 3881. The sign of the phase shifts in meson-nucleon scattering, 6222
Bethe, H. A., Maximon, L. and Low, F. Bremsstrahlung at high energies, 7903
Bethell, D. E. and Sheppard, N. The infrared spectrum of the H_3O^+ ion in acid hydrates, 7566
Bethge, H. Constructional details of an electrostatic laboratory microscope, 4851
Betteridge, W. Low-stress torsional creep properties of pure aluminium, 4427
Bettman, M. *See* Scott, A. F., 392
Bettoni, M. *See* Bertolini, G., 7881
Betts, D. D. *See* MacDonald, A. D., 6814
Betz, H. T. *See* Lewis, R. E., 171
Beu, K. E. On the use of X-ray film for the quantitative measurement of diffraction line intensities, 3737
Beun, J. A. *See* Poppema, O. J., 4289
Bevan, A. R. *See* Snowden, M., 3384
Bever, R. S. Diffusion of barium in an oxide-coated cathode, 7748
Bevilacqua, F. *See* Goertz, R. C., 2636
Beydon, J. *See* Bernas, R., 3544
Beyer, M. Brightness of comets and solar activity, 6396
Beyer, R. T. Acoustic relaxation in a van der Waals gas, 682. *See also* McNamara, F. L., 3068
Bezirganyan, P. A. *See* Borovskiĭ, I. B., 8067–8
Bhabha, H. J. Production of mesons and the localization of field energy, 7960
Bhagavantam, S. and Krishna Rao, K. V. Photoelastic effect in lead nitrate, 8346
Bhar, B. N. *See* Bhar, J. N., 1749
Bhar, J. N. and Bhar, B. N. On the phenomenon of "wiggles" or "beats" in nuclear magnetic resonance signals, 1749
Bhargava, B. N. A new early-morning ionospheric phenomenon, 2096
Bhatawdekar, M. G. Pressure in a liquid, 2236. *See also* Dogra, O. P., 7702; Ramaiah, N. A., 6821; Saxena, A. P., 3331, 7698
Bhatia, A. B. and Wolf, E. The Zernicke circle polynomials occurring in diffraction theory, 2386
Bhattacharya, B. *See* Asundi, R. K., 4011
Bhattacharya, B. N., Jr. *See* Asundi, R. K., 3991
Bhowmik, B. Negative primaries as part of cosmic radiation, 2522
Bianchi, A. M. *See* Bassi, P., 1720, 7770, 8471, 8504
Bianco, D. R. *See* Beard, C. I., 134; Jen, C. K., 3133
Biberman, L. M. On the theory of scattering of light in isotropic media, 3185
Bibl, K. Dynamical phenomena in the ionospheric layers, 1281
Bickford, L. R., Jr. The low temperature transformation in ferrites, 8533
Biddulph, R. *See* Davis, K. H., 1473
Bidelman, W. P. Anomalous abundances in cooler stars, 6437
Biedenharn, L. C. *See also* Blatt, J. M., 1100
Biedenharn, L. C., Blatt, J. M. and Rose, M. E. Some properties of the Racah and associated coefficients, 4246
Biedenharn, L. C., Boyer, K. and Charpie, F
  Angular correlations of the radiations from deu
  stripping reactions, 1118
Bier, K. *See* Becker, E. W., 2627–8
Bierl, R. On the relation between electrical
  mechanical sound production, 8297
Biermann, L. Origin of magnetic fields in m
  plasma, 3324. Physical processes in comet tail
  their relation to solar activity, 6406
Bigay, J. H., Dumont, R., Lenouvel, F. and Lune
  Photoelectric photometry of extra-galactic ne
  7404
Bigeleisen, J. Disproportionation in deuterated
  monia, 365. The effect of isotopic substituti
  the entropy, enthalpy, and heat capacity of ideal
  I. Systems in thermal equilibrium. II. Chem
  reacting systems, 8004. *See also* Perlman
  1999
Bigham, C. B. *See* Dawson, W. K., 2716
Bijl, A. *See* Keesom, W. H., 4065
Bijl, D. Note on thermal radiation at low tem
  tures, 2305
Bijvoet, J. M. and Lonsdale, K. The ionic sta
  LiH, 4484
Bilby, B. A. On the mutual transformation of la
  8766
Bilenko, I. I. *See* Vuks, M. F., 3188
Bilinski, S. The Dirac function and an eleme
  problem in hydrodynamics, 4636
Billig, E. and Dowd, J. J. *p–n* junction reveal
  electrolytic etching, 8404
Billing, H. Magnetic storage units with short c
  times for electronic calculating machines, 5831
Billings, D. E. *See* Fowler, F. E., 2309
Billmeyer, F. W., Jr and Webber, A. C. T
  dimensional color models constructed on the
  and Munsell systems, 2395
Biltz, M. Photographic sensitivity as a functi
  exposure time and temperature, 2122
Bingel, W. On the theory of solutions of alkali
  in liquid ammonia, 7503*
Binnie, A. M. The stability of the surface of a cavi
  bubble, 3909
Biondi, M. A. Diffusion, de-excitation and ioniz
  cross sections for metastable atoms. I, 1706.
  cesses involving ions and metastable atoms in
  cury afterglows, 6067
Biot, A. Certain unsymmetrical pancratic syste
  three lenses, 4686
Bird, G. R. *See* Blout, E. R., 1493
Bird, J. R. *See* Dyer, A. J., 4351
Birdsall, D. H. *See* Hotten, B. W., 3691
Birdsall, H. A. Insulating films, 828
Birger, A. G. *See* Azimov, S. A., 7757
Birkhoff, G. Formation of vortex streets, 2234
Birkhoff, R. D. *See also* Kalil, F., 7723; Mae
  R. E., 4328
Birks, J. B. The radiation decomposition of o
  molecules, 516. Scintillation counters, 6884
Birks, J. B. and King, J. W. The luminescence
  glass and quartz under *α*-particle irradiation,
Birks, J. B. and Szendrei, M. E. The absolute sci
  tion efficiency of anthracene, 6890
Birnbaum, G. Millimeter wavelength dispersio
  water vapour, 2346
Birnbaum, G., Bussey, H. E. and Larson, R. R.
  microwave measurement of variations in atmos
  refractive index, 2858
Birnbaum, W. *See* Smith, F. M., 8700
Birstein, S. J. The effect of relative humidity o
  nucleating properties of photolyzed silver i
  8128
Bishop, F. W. and Elliott, S. B. An external c
  of the spacing of the projector pole-piece eleme
  the RCA EMU electron microscope, 6843
Bishop, G. R. *See also* Marin, P., 7140
Bishop, G. R., Daniels, J. M., Goldschmidt
  Halban, H., Kurti, N. and Robinson, F.
  Polarized *γ*-rays from nuclei aligned at low
  peratures, 1896
Bishop, G. R., Preston, G., Westhead, J. M
  Halban, H. A *γ*-ray detector with low efficien
  fast neutrons, 6214
Bishop, J. F. W. A theoretical examination of the
  deformation of crystals by glide, 4419

P, M. E. and LIEBSON, S. H. Growth of cadmium ulfide crystals, 7278
P, R. E. D. Longitudinal elastic waves in cylinrical rods, 8278
L. *See* BERTOLINI, G., 7740, 7881
, F. Looking into the nucleus, 4269
, F., LACEY, R. F. and RICHTER, B. Optically nduced nuclear magnetization. A progress report, 632
, F., PLOTKIN, H., RICHTER, B., TEVIOTDALE, A. and OUNG, J. E. R. A "magnetic scanning" method or investigating hyperfine structure and isotope hift, 7558
TE, H., CHEVALLIER, R. and TSAÏ, B. Thermomagnetic properties of rhombohedral ferric oxide, 7794
ERUD, E. K. *See* KAVANAGH, R. W., 4680; ORK, C. M., 5104
ET, F. E. *See* HALL, T. C., JR, 750
K, F. A. The decay in fluorescence efficiency of rganic materials on irradiation by particles and hotons, 4035
K, S. A. *See* MOONEY, M., 2771
KBURN, A. and KIPLING, J. J. Raoult's law: a seudo-ideal system, 3237
KETT, P. M. S. A negative experiment relating to magnetism and the earth's rotation, 2531
KMAN, M. A note on oriented crystalline overrowth, 2806
KWELL, H. R. Brightness discrimination data for he specification of quantity of illumination, 2864. tudies of the form of visual threshold data, 5819
KWELL, J. H. Radial-axial heat flow in regions ounded internally by circular cylinders, 4755
A, F. A special kind of growth structure in metal ingle crystals, 5198. On the growth front of Zn nd Cd crystals, 8044
, G. W. SCOTT. Relativity and indeterminacy, 596
, J. S. and CHEW, G. F. Fourth-order corrections o the scattering of pions by nonrelativistic nucleons, 859
, J. S. and SEGALL, B. The impulse approximation nd field theoretical calculations. I, 620
E, J. and CHANTREL, H. Spin and nuclear moments of palladium 105, 5659
SE, B. S., BOUWERS, A. and BULTHUIS, H. W. Catadioptric microscope objectives with concentric mirrors, 4050
E, N. *See* GIBSON, G. E., 6296
EMORE, J. S., DE BARR, A. E. and GUNN, J. B. Semiconductor circuit elements, 8413
EY, F. A. Mechanism of fracture of concrete, 1951
C, D. Hydrogen–methylal fillings for Geiger-Müller counters with external cathodes, 1697. The mechanisms of self-quenching Geiger counters, 6874. External cathode Geiger-Müller counters for strong rradiation, using pure methylal fillings, 7735. *See also* DETŒUF, J. F., 1700; MAIGNAN, P., 5538
C, D., DETŒUF, J. F. and MAIGNAN, P. The detection of particles by scintillations. I. Photomultipliers, 1699
C, D. and UEBERSFELD, J. On the importance of the polyatomic [filling] constituent in external cathode counters, 7736
C, D. and ZYNGIER, H. On the application of Wilkinsons' theory to Geiger-Müller counters with external cathode, 7734
C-LAPIERRE, A. Transfer to the domain of optics of certain results of the theory of information, 725. Electronics, 6968. Theory of information, 6968
C-LAPIERRE, A., DUMONTET, P. and PERROT, M. Contribution to the study of certain problems of microscopy, 5378
C-LAPIERRE, A. and NIFONTOFF, N. On certain properties of potential barriers, 6487
C-LAPIERRE, A., PERROT, M. and PERI, G. A method of beats and a method of rectification [detection] allowing objects to be revealed of a smaller size than the normal limit of resolving power, 6685
CH, G. and YOWELL, E. C. Addendum to a guide to tables on punched cards, 3787
DIN, J. and LORIERS, J. Identification of traces of samarium in the presence of neodymium by fractional crystallization of the octahydrated sulphates of Sm and Nd in a magnetic field, 7269
BLANK, K. *See* SEILER, K., 6041
BLANKENBURG, G. and SCHUBART, G. The semiconducting properties of cuprous oxide. VI. The temperature dependence of electrical conductivity at temperatures between +20°c and −190°c, 8402
BLAQUIÈRE, A. Power spectrum of a non-linear oscillator whose amplitude-frequency relation is disturbed by noise, 1769
BLATT, J. M. The beta-decay of the triton, 1883. The beta-decay interaction, 1890. *See also* BIEDENHARN L. C., 4246; WEINBERG, I. G., 2612
BLATT, J. M. and BIEDENHARN, L. C. The angular distribution of scattering and reaction cross sections, 1100
BLATT, J. M. and WEISSKOPF, V. F. Theoretical nuclear physics, 4335
BLATZ, H. *See* JETTER, E. S., 1079
BLAU, M., OLIVER, A. R. and SMITH, J. E. Neutron and meson stars induced in the light elements of the emulsion, 7910
BLAU, M. and SALANT, E. O. *T*-tracks in nuclear emulsions, 1102
BLEANEY, B. Paramagnetic resonance in crystalline solids, 124. Anomalous paramagnetism of copper acetate, 8559. *See also* BAKER, J. M., 2615, 4280
BLEANEY, B., BOWERS, K. D. and TRENAM, R. S. The nuclear electric quadrupole moments of copper 63, 65, 6142
BLEANEY, B. and INGRAM, D. J. E. Paramagnetic resonance in potassium ferricyanide, 2544
BLEANEY, B. and SCOVIL, H. E. D. Paramagnetic resonance in praseodymium ethyl sulphate, 1751
BLEANEY, B., SCOVIL, H. E. D. and TRENAM, R. S. Hyperfine structure in [the paramagnetic resonance spectrum of] neodymium ethyl sulphate, 1750
BLEANEY, B. and STEVENS, K. W. H. Paramagnetic resonance, 8566
BLEICK, W. E. Tables of associated sine and cosine integral functions and of related complex-valued functions, 7375
BLET, G. Some attempts to interpret the laws governing the behaviour of photopiles, 6793. A new solution of the problem of attenuating luminances, 8303
BLET-TALBOT, D. Scattering by magnesia of polarized light, 4045
BLEULER, E. *See also* GAILAR, O., 2882
BLEULER, E., BLUE, J. W., CHOWDARY, S. A., JOHNSON, A. C. and TENDAM, D. J. Isomerism of In^{110} and In^{112}, 4996
BLEULER, E. and GOLDSMITH, G. J. Experimental nucleonics, 2633
BLEULER, E., STEBBINS, A. K. and TENDAM, D. J. The (α, n) and $(\alpha, 2n)$ cross sections of Ag^{109}, 5056
BLEULER, K. *See* ARNOUS, E., 6463
BLEVIN, W. R. Further studies of electrode phenomena in transient arcs, 6064. *See also* SOMERVILLE, J. M., 2472
BLEWETT, J. P. Radial focusing in the linear accelerator, 908. *See also* COURANT, E. D., 7729
BLIN-STOYLE, R. J. Spin-orbit coupling in the D–D reaction, 2694. Matrix elements in radiative transitions, 6466. *See also* SPIERS, J. A., 408–9
BLISARD, T. J. and GREENBAUM, B. A. Demonstrations to provide data for student computation in electricity, 2558
BLOCH, C. On field theories with non-localized interaction, 2197
BLOCH, F. *See* WANGSNESS, R. K., 2619
BLOCK, M. M. *See also* PASSMAN, S., 1909
BLOCK, M. M., PASSMAN, S. and HAVENS, W. W., JR. Production of charged π-mesons in H, D. C, Cu and Pb by 381-MeV protons, 1908
BLOEMBERGEN, N. On the magnetic resonance absorption in conductors, 984
BLOEMBERGEN, N. and TEMMER, G. M. Nuclear magnetic resonance of aligned radioactive nuclei, 3436
BLOK, J. and JONKER, C. C. A method for the computation of plural and multiple scattering correlations, 2742. Scattering of thermal neutrons by bound protons and deuterons, 2743
BLOKHINTSEV, D. On the propagation of signals in nonlinear field theory, 5292
BLOMBERG, B., KIHLBORG, L. and MAGNÉLI, A. The crystal structures of $(Mo, W)_{10}O_{29}$ and $(Mo, W)_{11}O_{32}$, 8104

Blomgren, R. A., Hart, E. J. and Markheim, L. S. Radioactive cobalt laboratory for chemical research, 4298
Bloom, M. *See* Perlman, M. M., 1844
Bloom, S. and Margenau, H. Quantum theory of spectral line broadening, 5951
Bloom, S. D. Internal pair conversion in Mg^{24}, 424
Bloom, W. *See* Zirkle, R. E., 8138
Blottiau, F. and Royer, H. Attempts to construct a standard white light source for colorimetry. I. Leucoscope, 3964
Blout, E. R., Parrish, M., Jr, Bird, G. R. and Abbate, M. J. Infrared microspectroscopy. III. A capillary cell for liquids, 1493
Blue, J. W. *See* Bleuler, E., 4996
Blüh, O. and Terentiuk, F. Liquid scintillation beta counter for radioactive solids, 921
Blum, E.-J. On an asymmetry of the radio radiation of the sun observed on decimetric wavelengths, 8189
Blum, E. J., Denisse, J. F. and Steinberg, J. L. Results of observations of an annular eclipse of the sun made on 169 Mc/s and 9350 Mc/s, 8188
Blum, J. J. and Morales, M. F. Light scattering of multicomponent macromolecular systems, 784
Blum, J.-M. On an electron–electron angular correlation, 1094. *See also* Gauthé, B., 4980
Blum, P. The structure of nickel boride NiB, 1260. *See also* Bertaut, F., 5215
Blumenthal, L. S. The operating principles of synchrotron accelerators, 3365
Boag, J. W. The saturation curve for ionization measurements in pulsed radiation beams, 3395
Boas, M. L. Nomograms used in analysis of data in the reaction $Li^6(n, \alpha)H^3$, 5829
Boas, W. and Nicholas, J. F. Validity of Matthiessen's rule for cold-worked wires, 4422
Boato, G., Careri, G. and Volpi, G. G. Hydrogen isotopes in steam wells, 4297
Bobovich, Ya. S. and Gurevich, D. B. Photoelectric recording of Raman spectra in polarized light, 7593
Bock, H. and Golde, H. A compensation process for the measurement of industrial heat flows applied to the investigation of the efficiency of electric cookers, 6735
Bockelman, C. K. *See* Miller, D. W., 456
Bockris, J. O'M. A brief summary of hydrogen electrode kinetics, 7247
Bockris, J. O'M. and Parry-Jones, R. Determination of the relative electrode potential of an uncharged metal in solution, 8016
Bockris, J. O'M. and Parsons, R. Calculation of the concentration of atomic hydrogen at a cathode, 4446
Bodansky, D., Sachs, A. and Steinberger, J. Differential cross sections for the scattering of 58-MeV π^+ mesons in hydrogen, 7167. Phase shift analysis of the scattering of positive mesons at 58 MeV, 7168
Bode, F. Photomicrography without an eyepiece, 8352
Bodmann, O. *See* Schulz, G. V., 3089
Bodó, Z. Measurement of the ultraviolet absorption of fluorescent powders by their diffuse reflexion, 1537. Determination of quantum efficiency of luminescent powders by calorimetric measurement, 6655. *See also* Nagy, E., 1544
Boehm, F. *See also* Wu, C. S., 7085
Boehm, F., Marmier, P. and Preiswerk, P. Relative cross-sections for the excitation of isomeric and ground states by the (*p*, *n*) reaction, 7129
Boehm, F., Peaslee, D. C. and Perez-Mendez, V. Search for 1-MeV gamma from N^{16} decay, 6202
Boelhouwer, M. *See* Aten, A. H. W., Jr, 4318, 5004; Wapstra, A. H., 7867
Boer, J. de. *See* de Boer, J.
Boer, J. H. de. *See* de Boer, J. H.
Böer, K. W. and Kümmel, U. Luminescence of cadmium sulphide single crystals in strong direct electric fields, 766
Böer, K. W., Kümmel, U. and Rompe, R. A contribution to the problem of breakdown of solid insulators, 876
Boersch, H. A retarding field filter for electron diffraction and electron microscopy, 6081. Energy distribution of thermal electrons from electron beam producers, 7710
Boeschoten, F. *See* Milatz, J. M. W., 3976
Bogaardt, M. Calculations on neutron flux distr tion in the JEEP, 7159. The reactivity of the J as a function of control plate position, 7162. S remarks on the influence of the expansion of h water on the reactivity of a nuclear reactor, 7 *See also* Holt, N., 7739
Bogaardt, M. and Bustraan, M. Some gen aspects of thermal breeding, 7941
Bogaardt, M. and Holt, N. Measurements of neu and gamma radiation around the JEEP, 7160
Bogart, D. Estimation of neutron energy for resonance from thermal-neutron absorption c sections, 1131
Bogert, B. P. On the band width of vowel forma 6574
Boggs, F. W. Bibliography on rubber insulation, 8
Bogle, G. S., Duffus, H. J. and Scovil, H. E. D. nuclear electric quadrupole moment of erbium 378
Bogoroditskiĭ, N. P. and Verbitskaya, G. N. Ele properties of ferroelectric ceramics near the C point, 6758
Bohm, D. Comments on a letter concerning the ca interpretation of the quantum theory, 2179. P that probability density approaches $|\psi|^2$ in ca interpretation of the quantum theory, 2180. Q tum theory, 2181. *See also* Coleman, J. H., 48
Bohmer, R. *See* Freymann, R., 5392
Bohn, C. R., Freeman, N. K., Gwinn, W. D., Hol berg, J. L. and Pitzer, K. S. A spectrometer fo far infrared and the spectrum of 1,2 dichloroeth 4018
Bohr, A. and Mottelson, B. R. Interpretatio isomeric transitions of electric quadrupole type, 2 Beta-decay and the shell model, and the influ of collective motion on nuclear transitions, 6 Rotational states in even–even nuclei, 6212
Bokhoven, C. and Hoogschagen, J. Diffusion porous catalysts, 3014
Bokiĭ, G. B. The system of the atomic radii o metals, 7845
Bokiĭ, G. B. and Gilinskaya, É. A. The determina of the structural type of $KCo(NO_2)_4(NH_3)_2$, 7 X-ray structural investigation of the compo $K_2[Pt(NO_2)_4Cl_2]$ and $K_2[Pt(NO_2)_4Br_2]$, 8108
Boldyrev, N. G. *See* Pinegin, N. I., 5821
Boley, F. I. and Dunavan, D. S. Radioactive deca Y^{91}, 4991
Bolgiano, P., Madansky, L. and Rasetti, F. continuous gamma-ray spectrum accompan beta-decay, 2665
Bolle, A. and Dominici, P. Contribution to the cal tion of absorption in the ionospheric propagati short waves, 7807
Bollinger, L. M. *See* Barrett, P. H., 1731
Bolotovskiĭ, B. and Kolomenskiĭ, A. Losses of e of a charge[d particle] in uniform movement, 77
Bol'shova, K. M. Magnetization of heteroge materials in strong fields, 5573. *See also* Ak N. S., 5574
Bolt, R. H. The aircraft noise problem, 5356
Bolton, H. C. *See* Abbott, J. A., 4260
Bolton, J. H. and Williams, S. E. Spectrophoton measurements in the vacuum ultra-violet photomultipliers, 3102
Bonanomi, J. and Rossel, J. Luminescent scintilla in the alkali iodides, 5405
Bondelid, R. O. *See* Allred, J. C., 911
Bondi, A. The spreading of liquid metals on solid faces. Surface chemistry of high-energy substa 6526
Bondi, H. Accretion and the origin of comets, 639
Bondi, H. and Gold, T. Relativity and indetermi 596
Bonét-Maury, P. and Ertaud, A. The mortal e of total irradiation in the Zoe Pile on mice. component radiations in the lethal action of irradiation of mice in the uranium pile, 2105
Bonetti, A., Dallaporta, N., Merlin, M. and Das G. Production of mesons in several conde materials, 8506
Bonfigioli, G. Fusion as hydrodynamic instabili thermal wave propaganda, 180
Bonifas, H. On the Schottky equation of therm emission, 2518

emay, M., Makram, H. and Royon, J. Contribu- ion to the study of the diffusion of ions through netallic coatings, 1215
emay, M. and Vergnolle, J. Conductivity of trong electrolytes with respect to superposed alter- nating fields, 6287. Experimental study of the electrolysis of aqueous solutions of cadmium sul- phate by alternating current, 6289
ier, T. W. *See also* Conner, J. P., 1116; Shalek, R. J., 8742
ier, T. W., Conner, J. P. and Lillie, A. B. Cross section and angular distribution of the He^3(d, p)He^4 nuclear reaction, 1117
iet, A. *See* Faraggi, H., 452, 2131
ievay, G. and Michel, L. Angular momentum and parity of systems composed of two identical bosons of zero mass, 4601
nier, E. Investigations on the electrolysis of molten aluminates, 7244
nor, W. B. Certain exact solutions of the equations of general relativity with an electrostatic field, 2927
rse, H. A. *See* Lesensky, L., 191; Smith, B., 5442; Worley, R. D., 198
h, A. D. On two problems in potential theory and their application to the design of magnetic recording heads for digital computers, 955. The cut-off phenomena of protein crystallography, 2085. A "zero" synthesis for Fourier refinements, 3743. Cylindrical Patterson syntheses for the investiga- tion of chain directions in X-ray crystal analysis, 5212
th, E. C. *See* Rasetti, F., 7104
th, E. T. *See* Bernardini, G., 1106
, F. Statistical investigation of the fundamental processes in the quantum theory of elementary particles, 4588. A statistical model for the basic processes in the quantum theory of particles, 6468. Transition from the microcanonical to the canonical total by means of the δ-function, 6491
, J. A new photographic method of measuring the dispersion of the optical constants of metals, 157
de, A. H. de. *See* de Borde, A. H.
doni, P. G. Statistical theory of frequency changes in the normal modes of a solid with temperature and volume, 6979
doni, P. G. and Nuovo, M. Measurement of velocity of elastic waves in solids at elevated temperatures, 8285
eli, F. A channel-selecting scale-of-50, 6114
elius, G. On fusion as order–disorder transition, 4779
elius, G., Berglund, S. and Sjöberg, S. Measurements on the evolution of heat during the recovery of cold-worked metals, 3660
gars, S. J. A wide range temperature controller using a resistance element, 3266
gne, E. Le. *See* Le Borgne, E.
gnis, F. On the physics of sound radiation pressure, 5910
gnis, F. E. On the forces due to acoustic wave motion in a viscous medium and their use in the measurement of acoustic intensity, 5352
ie, B. *See* Roberts, L. D., 8385
ie, B. S., Jr. *See* Jetter, L. K., 5783
nschein, H., Pape, R. and Zakovsky, J. Concerning the sensitivity of the human retina to X-rays, 8143
ovik, E. S. Change of resistance of metals in a magnetic field at low temperature, 3319. Hall effect in beryllium and aluminium at low temperatures, 4938
ovinskiĭ, L. A. *See* Vol'kenshtein, M. V., 8617
ovskiĭ, I. B. and Bezirganyan, P. A. The diffraction of X-rays by bent crystals. Kinematic theory—case of transmission, 8067. The diffraction of X-rays by bent crystals, Kinematic theory—case of reflection, 8068
ovskiĭ, I. B. and Golovner, T. M. Multiplicity in X-ray emission spectra, 5503
owitz, S. and Friedman, B. Variational principles for three-body scattering problems, 2201
ries, B. von. *See* von Borries, B.
sellino, A. Momentum transfer and angle of divergence of pairs produced by photons, 3570
st, J. M. *See* Cooper, F. S., 713*

Borst, L. B. Resonance scattering in indium, 6218. *See also* Kunstadter, J. W., 7937
Borst, L. B. and Sailor, V. L. Neutron measurements with the Brookhaven crystal spectrometer, 3624
Bortner, T. E. and Hurst, G. S. Energy per ion pair for 5-MeV alpha-particles [from Pu^{239}] in helium, 5009
Bory, C. Tentative theory relating to diffusion in a moving fluid, 6532. A theoretical study, by the method of continuity, of the mixture of fluids due to turbulence, 6533. Experimental study of convection from moving walls, 7622
Bosch, A. Vanden. *See* Vanden Bosch, A.
Bose, H. N. and Sharma, J. Decay of long period afterglow of alkali halides under cathode ray excitation, 6665
Bose, H. N., Sharma, J. and Chatterjee, A. On the luminescence of some organic phosphors under X-rays and cathode rays, 3163
Bose, S. N. The divergence identities in [Einstein's] new unified theory, 6444
Bot, J. Le. *See* Le Bot, J.
Botden, P. J. M., Combée, B. and Houtman, J. An experimental X-ray apparatus with midget X-ray tube, 3344
Bothe, W. A new neutral particle in cosmic radiation? 8486
Bots, G. J. C. and Gorter, C. J. Fountain effect in helium II below 1°K, 6728
Botsford, J. H., Lane, R. N. and Watson, R. B. A reverberation chamber with polycylindrical walls, 697
Böttger, O. *See* Bahn, R., 8309; Mönch, G. C., 8301
Botzen, A. *See* Michels, A., 2402
Bouchard, J. On the ionospheric propagation of decametre-waves in polar arctic regions, 3466
Boucher, R. Influence of the ratio of the flow of air and of liquid on the fineness of micromists, 2028
Bouchez, R. K-capture – β^+-emission branching ratio, 5016
Bouchez, R. and Nataf, R. β-disintegrations and nuclear structure. III. Over-allowed transitions, 7036
Bouchez, R., Robert, J. and Tobailem, J. Effect of nuclear structure on the statistical law for the binding energies, 7835
Boudart, M. Sound dispersion in *cis-* and *trans-*dichloroethylene vapors, 5915
Bouffant, L. Le. *See* Le Bouffant, L.
Bouissières, G. *See also* Victor, C., 1897
Bouissières, G., Falk-Vairant, P., Riou, M., Teillac, J. and Victor, C. Study of the γ-radiations emitted by ionium and radiothorium, 7102
Bouix, M. Study of dielectrics; dielectric, constant, dielectric loss and breakdown. I, 1618; II, 1619
Boulanger, R. Determination of small quantities of radon by a counting method, 5668
Boulger, F. W. *See* Udy, M. C., 8155
Boullé, A. and Jary, R. Determination of the stoichiometric composition of a substance by means of its X-ray powder diagram: application to a new phosphate of silica, 8111
Boullé, A. and Mariée, M. A new cause of spottiness of X-ray powder diffraction lines, 5208
Boulloud, A. Cooling of fine wires in compressed air and application to pre-breakdown currents, 6813
Bouman, M. A. Peripheral contrast thresholds for various and different wavelengths for adapting field and test stimulus, 1311. Mechanism in peripheral dark adaptation, 2110. Visual thresholds for line-shaped targets, 4530
Bourgeois, J., Ertaud, A. and Jacquesson, J. Investigation of several special shielding concretes, 7962
Bourgeois, J., Jacquesson, J. and Zaleski, P. Distribution of the density of thermal neutrons in a semi-infinite diffusing medium irradiated by a flux normal to its surface, 5723
Bourrat, J., Chaudron, G. and Epelboin, I. The influence of oxygen, contained in high purity irons in the form of a solid solution, on certain of their magnetic properties in weak alternating fields, 2539
Bouška, J. Absolute brightness of comets, 6394
Boutry, G. A. and Piétri, G. Potassium ion currents of high density, 6871
Bouttier, L. and Dunoyer, J. M. Description of a camera for taking Debye–Scherrer photographs of specimens at very low temperatures, 5205

Bouvier, P. On the neutrino energy of a supernova, 3818
Bouwers, A. *See* Blaisse, B. S., 4050
Bouwkamp, C. J. Diffraction theory. A critique of some recent developments, 7802
Bovey, L. F. H. Rotation–vibration spectra of diatomic and simple polyatomic molecules with long absorbing paths. X. The spectrum of tri-deuteromethane in the photographic infrared, 5398
Bowden, F. P. Friction on snow and ice, 7226
Bowden, F. P. and Singh, K. Size effects in the initiation and growth of explosion, 8735
Bowden, F. P. and Tabor, D. The influence of surface films on the friction and deformation of surfaces, 4400
Bowden, F. P. and Yoffe, A. D. Initiation and growth of explosion in liquids and solids, 2780
Bowe, P. W. A. A study of individual radio atmospherics received simultaneously at two places, 8594
Bowell, E. *See* Lockett, E. E., 3604
Bowen, E. G. Radar observations of natural rain, 1288
Bowen, H. J. M. Structure of selenium tetrafluoride, 8803
Bowen, I. S. Optical problems at the Palomar Observatory, 579. The spectrographic equipment of the 200-inch Hale telescope, 2145
Bowen, J. H. Automatic control characteristics of thermal neutron reactors, 1925, 4376. *See also* Burnup, T. E., 6234
Bowen, W. A., Jr. *See* Singer, S. F., 2100
Bowers, K. D. Paramagnetic resonance in potassium chromicyanide, 968. Paramagnetic resonance in an argentic compound, 8568. *See also* Baker, J. M., 4280; Bleaney, B., 6142
Bowers, R. The adsorption of gases at high saturations. I. The adsorption of nitrogen, argon and oxygen, 8033; II. The thickness of the unsaturated helium film, 7636
Bowers, W. A. On an application of the Fermi–Thomas method to molecules, 6993
Bowey, E. M. *See* Hodgson, E. R., 2720
Bowlden, H. J. The high frequency end of the bremsstrahlung spectrum, 4858
Bowman, F. E. *See* Eggleston, R. R., 3731
Boyar, R. E. *See* Harrer, J. M., 460
Boyd, A. W. *See* MacKenzie, D. R., 5673
Boyd, C. A. *See* Daniels, F., 5415
Boyd, D. R. J. and Thompson, H. W. A vibration-rotation band of monodeuteromethane, 3495
Boyd, F. C. *See* Green, D. T., 7117
Boyd, G. E. and Charpie, R. A. Mass assignment and gamma-radiations of the seven-hour molybdenum isomer, 1060
Boyd, M. J. *See* Agnew, J. T., 1318
Boyd, T. F. *See* Nickerson, D., 3195
Boyer, K. *See* Biedenharn, L. C., 1118
Boyer, R. A. Translational dispersion in monatomic gases, 677
Boyle, A. J. F. *See* Campbell, J. G., 6109; Inall, E. K., 8679
Boyle, W. S. *See* Baird, D. C., 7665
Boynton, R. M. Stray light and the human electroretinogram, 5815
Boys, S. F. Electronic wave functions. IX. Calculations for the three lowest states of the beryllium atom, 4295. X. A calculation of eight variational polydetor wave functions for boron and carbon, 4968
Bozman, W. R. *See* Corliss, C. H., 4753
Bozorth, R. M. Behavior of magnetic materials, 4204. The permalloy problem, 8529. *See also* Williams, H. J., 8534
Bozorth, R. M. and Hamming, R. W. Measurement of magnetostriction in single crystals, 2578
Bozorth, R. M. and Walker, J. G. Magnetostriction of single crystals of cobalt and nickel ferrites, 1795. Magnetic crystal anisotropy and magnetostriction of iron-nickel alloys, 2579
Braams, C. M. On the influence of friction on the motion of a top, 2217
Braams, R. and Smith, C. L. Photoneutron reaction in Ca^{40}, 6228
Bracci, A., Facchini, U. and Malvicini, A. The spectrum of the γ-radiation emitted in the reaction $n + p \rightarrow d + \gamma$, 5035. Spectrum of the γ-radiation emitted in the reaction $^{10}\mathrm{B}(n,\alpha)^{7}\mathrm{Li}^{*}$; $^{7}\mathrm{Li}^{*} \rightarrow {}^{7}\mathrm{Li} + \gamma$, 8662
Bracci, A. and Zimmer, E. L. Drift velocity
electrons in BF$_3$, 8479
Bracewell, R. N. The sunspot number series, 456
Brackmann, J. *See* Kornetzki, M., 6130
Bradbury, C. H. The measurement and interpretat
of machinery noise with special reference to
engines, 3073
Bradfield, G. and Pursey, H. The role of prefer
orientation in elasticity investigations, 7985
Bradley, G. Echo ranging with audiofrequencies, 3
Bradley, L. C., III. A temperature-sensitive phosp
used to measure surface temperatures in ae
dynamics, 3026
Bradley, R. S. A silica micro-balance; its construct
and manipulation and the theory of its action, 2
Rates of evaporation. VII. The theory of the
of evaporation and vapour pressure of potass
chloride, 6710
Bradley, R. S. and Volans, P. Rates of evaporat
VI. The vapour pressure and rate of evaporatio
potassium chloride, 6709
Bradshaw, C. G. *See* Brailsford, F., 6957
Bradshaw, F. J., Hoyle, G. and Speight, K. Diffus
of silicon in ferrite, 4404
Bradshaw, J. A. Calculation of the propagation
stants of an inhomogeneously-filled waveguide, 1
Bragard, L. On the fundamental problem of dynam
geodesy. I, 589
Bragg, J. K. *See also* Sharbaugh, A. H., 6825
Bragg, J. K., Crowe, R. W. and Sharbaugh, A.
The breakdown of dielectrics, 828
Bragg, W. L. X-ray analysis of proteins, 2084
Brahmachary, R. L. On the possibility of a new st
cosmological model, 5848; II, 8207
Brailsford, F. and Bradshaw, C. G. Alternat
current energy losses in iron laminations at mag
saturation, 6957
Bramley, A. *See also* Rosenthal, J. E., 220
Bramley, A. and Rosenthal, J. E. Field depen
fluorescence of vitreous Zn$_2$SiO$_4$ phosphor,
Transient voltage indicator and information dis
panel, 6667
Bramson, H. J., Seifert, A. M. and Havens, W. W.
The energy spectrum of positrons from the deca
the μ-meson, 472
Brand, F. A. *See* Jacobs, H., 904
Brandmüller, J. An intense-light Raman powd
crystal arrangement, 6661
Brandmüller, J. and Moser, H. Self-recording
Raman spectra, 151
Brandstaetter, F. Remarks on H. Mache's met
for the determination of the diffusion coefficien
air in water, 4649
Brandstätter, M. Spiral growth of organic compou
from the vapour phase, 8763
Brandy, J. H. and Le Roy, D. J. The photochlorina
of methyl chloroformate in the gas phase, 7252
Brannock, K. C. *See* Wilcox, W. S., 4015
Bransden, B. H. On Jastrow's interaction and
elastic scattering of high energy protons by deuter
2498
Bransden, B. H. and Dalgarno, A. A variati
method for radiationless transitions, 25.
application of variational methods to scattering
ions. I. The elastic scattering of electrons
helium ions, 3359
Brattain, W. H. *See also* Portis, A. M., 6775
Brattain, W. H. and Bardeen, J. Surface properti
germanium, 1637
Brattsten, I. Continuous zone electrophoresis
crossed velocity fields in a glass powder colu
The arrangement of a constant liquid flow
description of a simple pump apparatus, 4818
Brauer, G., Jander, J. and Rögener, H. On the st
ture and synthesis of niobium-nitrogen compou
6317
Brauer, P. On the incorporation of Mn ions in
and KCl, 3720. On Tl$^+$ in alkali halides, 8329
Braun, A. Anomalies in the field of microhard
7223
Braun, P. B. Crystal structure of BaFe$_{18}$O$_{27}$, 1263.
superstructure in spinels, 2081
Braune, H. and Steinbacher, E. Dissociation of
phur vapour. II, 1206
Bray, P. J. *See* Harrick, N. J., 5655

AUTHOR INDEX

y, R. *See also* Navon, D., 849

y, R. and Gossick, B. R. Effect of transit time on Ge rectifier behavior, 8421

čka, M. A remark on proper Lorentz transformation of Dirac's equations, 4599

zeale, F. B. *See* Irvin, B., 8718

zeale, W. M. The "Swimming Pool"—a low cost research reactor, 2730

ckenridge, R. G. Semiconducting intermetallic compounds, 4804

ckenridge, R. G. and Hosler, W. R. Titanium dioxide rectifiers, 2453. Electrical properties of titanium dioxide semiconductors, 8414

ckon, S. W. *See* Martin, W. M., 7068

do, I. I. The resolving power of photographic material to ultra-violet light, 7367

do, I. I. and Pruss, P. Kh. Spectral distribution of light scattered by photographic layers and the influence of sensitization on resolving power, 6362

t, G. *See also* Gluckstern, R. L., 6073

t, G. and Hull, M. H., Jr. Advances in knowledge of nuclear forces, 2958

t, G. and Thaler, R. M. Relativistic corrections to magnetic moments of nuclear particles, 1843, 4278

tling, G. Wavelength dependence of the fluorescence of organic phosphors in the X-ray region, 5968. *See also* Richter, H., 8715

tling, G. and Glocker, R. Measurement of the β- and γ-radiation of radioactive materials in Röntgen units, 1072

khovskikh, L. M. On the theory of the displacement of rays at the total reflection of spherical waves, 103. Diffraction of waves on a rough surface. I. General theory, 5421; II. Applications of the general theory, 5422

khovskikh, L. M. and Ivanov, I. D. On the extension of the range of applicability of ray theory to the propagation of waves in stratified media, 5375

mmer, H. The derivation of paraxial constants of electron lenses from an integral equation, 4136. A simple approximation formula for the field distribution along the axis of magnetic electron lenses with unsaturated pole pieces, 4840

net, J. Relationship between the electrical and geometrical characteristics of an electrochemical cell with manganese dioxide as depolarizer, 1219

net, J. and Moussard-Briot, A.-M. Physical and chemical characteristics of oxygen compounds of manganese correlated with their catalytic and depolarizing properties, 1218

nig, W. *See* Leibfried, G., 6016

nnan, J. G. and Sachs, R. G. Nuclear photoprocesses at high energy, 1127

nnan, J. N. Large amplitude vibrations of rods and tubes at audiofrequencies, 5911

nnan, L. E. Spontaneous oscillations in gas discharge tubes, 4223

nnan, R. O. and Mulligan, J. F. Two-center heteronuclear hybrid Coulomb-exchange integrals, 358

nner, S. and Brown, G. E. Calculations of K absorption edges in some heavy atoms, 7046

sker, R. I. *See* Appen, A. A., 834

sler, A. E., Zabavin, V. I. and Zubko, A. M. An X-ray investigation of cokes, 1970

tonneau, P. Measure of the period of B^{12} and of Li^8, 4978

tonneau, P. and Moreau, J. A [Tricker] β-spectrometer with uniform magnetic field, 5517

wer, A. W. An electrometer valve voltmeter of wide range, 3282

wer, D. F. and Mendelssohn, K. The formation of the helium film, 4060. Anomalous surface tension in helium II, 8368. Inconsistencies in adsorption experiments of helium II, 8370

yer, B. and Gutmann, F. Solution of the Debye–Hückel equations for a polarized electrode, 8020

yer, B. and Hacobian, S. Tensammetry: a method of investigating surface phenomena by a.c. current measurements, 527

yer, B. and McPhillips, J. An indirect polarographic determination of calcium, 8756

zinšćak, M. Rationalization in the light of quantity equations, 8201

Brice, M. K. *See* Cork, J. M., 4304, 4995, 5000, 7079

Brickl, D. E. *See* Griffith, W., 2265

Brickstock, A. and Pople, J. A. The spatial correlation of electrons in atoms and molecules. II. Two-electron systems in excited states, 1846; III. The influence of spin and antisymmetry on the correlation of electrons, 7842; IV. The correlation of electrons on a spherical surface, 7843

Brickwedde, F. G. *See* Armstrong, G. T., 7626

Bridge, H. *See* Annis, M., 8483

Bridge, H. S. *See also* Annis, M., 4884

Bridge, H. S., Peyrou, C., Rossi, B. and Safford, R. Cloud-chamber observations of the heavy charged unstable particles in cosmic rays, 6122. Study of neutral V particles observed in a multiplate cloud chamber, 7178

Bridge, H. S. and Rediker, R. H. Ionization chamber measurements of the absorption of the N-component of cosmic rays in lead, 309

Bridgman, C. S. The correction of low intensity luminance functions for the Purkinje effect, 1309

Bridgman, P. W. The [electrical] resistance of 72 elements, alloys and compounds to 100 000 kg/cm², 837. The effect of pressure on the tensile properties of several metals and other materials, 5740

Bridgman, P. W. and Šimon, I. Effects of very high pressures on glass, 4435

Briegleb, G. and Angerer, G. A new phenomenon in the absorption spectrum of the picrate ion, 5955

Brière, M. *See* Weill, J., 5713

Brierley, J. S. *See* Beattie, J. A., 75–6

Briggs, H. B. Infrared absorption in high-purity germanium, 144

Briggs, H. B. and Fletcher, R. C. New infrared absorption bands in p-type germanium, 130

Briggs, L. J. The limiting negative pressure of mercury in Pyrex glass, 3913. The limiting thickness of an electrolyzed gas film capable of sustaining a given negative pressure, 6548

Bril, A. and Klasens, H. A. New phosphors for flying-spot cathode-ray tubes, 1549. Instrinsic efficiencies of phosphors under cathode-ray excitation, 1555

Brin, A. and Cotton, P. Action of an electric field on the spreading of certain liquids over a plane, 6520

Brini, D., Rimondi, O. and Filosofo, I. μ-Meson spectrum at sea level, 1715

Brink, F., Jr. *See* Connelly, C. M., 8822

Brinkley, T. A. *See* Titterton, E. W., 3597, 4356, 7928

Brinkman, J. A. *See* Dixon, C. E., 8452

Brinkworth, M. J., Goward, F. K. and Wilkins, J. J. Identification of (γ, $p\alpha$) reactions in nuclear emulsions, 5068

Brinton, R. K. *See* Volman, D. H., 1202

Brisbane, A. D. *See* Beck, A. H., 6541

Brisi, C. *See* A. Hedvall, J. A., 4402

Bristow, J. R. Noise in private cars, 3072

Britten, R. The scattering of 31·5-MeV protons from several elements, 273

Brix, P. Isotope displacement in the atomic spectra of the rare earths. (The isotope displacement constants of Eu, Gd and Yb.), 118. Nuclear magnetic moment of Pr^{141} from the hyperfine structure of Pr II, 4282

Brix, P. and Engler, H. D. Isotope displacements in the Gd I spectrum, 1500

Brix, P., v. Buttlar, H., Houtermans, F. G. and Kopfermann, H. The isotope shift between RaD and the stable lead isotopes, 1499

Broch, J. Coefficient of fugacity of saturated vapours. Case of water and ammonia, 5447

Brochard, J., Chabbal, R., Chantrel, H. and Jacquinot, P. On the fine structure of the helium triplets, 1498

Brochard, J. and Jacquinot, P. A photoelectric spectrograph with double beam and high resolution, 5381. Observation of forbidden components in the Zeeman effect, caused by nuclear spin, 5383

Brock, E. G., Houde, A. L. and Coomes, E. A. Periodic deviations in the Schottky effect for molybdenum, 2517

Brock, P. The nature of solutions of a Rayleigh-type forced vibration equation with a large coefficient of damping, 7518

Brockhouse, B. N. The initial magnetization of nickel under tension, 3439. Resonant scattering of slow neutrons, 3625. Antiferromagnetic structure in Cr_2O_3, 6136
Brockhouse, B. N. and Hurst, D. G. Energy distribution of slow neutrons scattered from solids, 1154
Brockman, F. G. *See* Corliss, L. M., 6134
Brockway, L. O. *See* Bartell, L. S., 6184, 6360, 8449
Broder, J. *See* Keck, P. H., 4646; Lehovec, K., 5439
Broding, R. A. *See* Clewell, D. H., 7341
Brodskiĭ, A. *See* Ivanenko, D., 5300
Brodsky, A. Determining neutron fluxes from a pulsating radiator, 2744
Brodyanskiĭ, V. M. *See* Ishkin, I. P., 6023–4
Broglie, L. de. *See* de Broglie, L.
Brogren, G. The X-ray diffraction from quartz and the influence of surface treatment, 4410. Concerning the possibility of using ground calcite crystals as X-ray gratings, 6828. *See also* Alexopoulos, K., 1090, 4288
Brogren, G. and Adell, O. The transmission and absorption of X-rays in calcite near the Bragg angle, 7302
Broida, H. P. Rotational and vibrational "temperatures" of CH in flames at atmospheric pressure, 2409. Effects of self-absorption on rotational "temperatures" of OH in flames, 6718. *See also* Bass, A. M., 3150; Kane, W. R., 2410
Broida, H. P. and Gaydon, A. G. The mechanism of formation of OH, CH and HCO in flame spectra, using deuterium as tracer, 7233
Broida, H. P. and Kane, W. R. Rotational intensity distributions of OH and OD in an electrodeless discharge through water vapour, 3143
Brokmeier, K. H. Possibilities of model investigation in heat conduction research, 2403
Brolley, J. E., Jr. Isomeric branching and threshold behavior of the reaction $Mo^{92}(n, 2n) Mo^{91}$, 3605
Brolley, J. E., Jr, Fowler, J. L. and Schlacks, L. K. $(n, 2n)$ reactions in C^{12}, Cu^{63}, and Mo^{92}, 1134
Bromley, D. A. The ground-state parity of N^{14}, 1119. *See also* Fulbright, H. W., 1122
Bromley, D. A., Bruner, J. A. and Fulbright, H. W. Angular distributions of protons from the reaction $F^{19}(d, p)F^{20}$, 2697
Bronk, D. W. *See* Connelly, C. M., 8822
Bronowski, J., Fitzgerald, D., Gillings, D. W. and Rhys-Jones, D. C. Plastic properties of coking coals, 3654
Bronshteĭn, I. É. *See* Dobretsov, L. N., 939
Bronwell, A. Advanced mathematics in physics and engineering, 6372
Bronzo, J. *See* Truell, R., 4666
Bronzo, J. A. and Anderson, J. M. The effectiveness of plastic focusing lenses with high intensity ultrasonic radiation, 689
Brooks, C. E. P. and Carruthers, N. Handbook of statistical methods in meteorology, 4495
Broom, T. The effect of temperature of deformation on the electrical resistivity of cold worked metals and alloys, 1648
Broser, I. and Reichardt, W. Influence of lattice defects, produced by pressure, on the luminescence of ZnS phosphors, 5972
Broser, I. and Warminsky, R. On the electrical conductivity accompanying the phosphorescence of cadmium sulphide crystals, 1546
Brosi, A. R. *See* Ketelle, B. H., 5003
Brossel, J. Detection of the magnetic resonance of excited atomic levels. Structure of the 6^3P_1 level of the mercury atom, 2624
Brossel, J., Kastler, A. and Winter, J. Optical creation of an inequality of population between the Zeeman sub-levels of the ground state of atoms, 5662
Brot, C. *See* Lagerda, L., 5459
Brouckère, L. de. *See* de Brouckère, L.
Broude, V. L. Investigation of various modifications of hexamethylbenzene in polarized light, 1252
Broude, V. L. and Prikhotko, A. F. Absorption spectra of benzene monocrystals in polarized light, 748
Brous, J., Fankuchen, I. and Banks, E. Rare earth titanates with a perovskite structure, 8106
Brovetto, P. and Ferroni, S. Forbidden transition the paramagnetic resonance spectra of chromi alums, 8557
Brown, A. F. Surface effects in plastic deformation metals, 490
Brown, B. M. and Tomboulian, D. H. The nucl moments of Ta^{181}, 1034
Brown, C. and Franson, K. D. Manometric determi tion of the density of liquid ozone, 5318
Brown, D. A. H., Chasmar, R. P. and Fellgett, P. The construction of radiation thermocouples us semi-conducting thermoelectric materials, 6733
Brown, D. A. H. and Roberts, V. A simple high-sp spectrometer for the infra-red region, 3100
Brown, F. *See also* Bartholomew, R. M., 5091, 70
Brown, F. and Yaffe, L. The independent yield Xe^{135} produced in the fission of natural uranium pile neutrons, 5089
Brown, F. B., Jr and Masket, A. V. A statistical stu of the distribution of stars in nuclear emulsio 1734
Brown, G. E. Bound-state perturbation theory in fo dimensional momentum representation, 2193. *also* Brenner, S., 7046
Brown, G. E. and Woodward, J. B. Coherent scat ing of gamma-rays by bound electrons, 2674
Brown, H. B. and Stump, R. Continuous gamn radiation accompanying internal conversion Ba^{137m}, 6217
Brown, H. N. *See also* Bendel, W. L., 6201
Brown, H. N. and Becker, R. A. Excitation o 16-microsecond state in Ta^{181} by capture of bre strahlung, 5693
Brown, J. L., Graham, C. H., Leibowitz, H. a Ranken, H. B. Luminance thresholds for resolution of visual detail during dark adaptati 4531
Brown, K. T. Factors affecting differences in appar size between opposite halves of a visual meridi 5822
Brown, L. C., Rogosa, G. L. and Schwarz, G. angular shift of the transmitted X-ray beam near Bragg angle, 537
Brown, L. M. Grain density in nuclear emulsions, 6
Brown, R. D. and Matsen, F. A. A united-at treatment of conjugated systems, 7826
Brown, R. H. and Hazard, C. A model of the ra frequency radiation from the Galaxy, 7393
Brown, R. H., Jennison, R. C. and Das Gupta, M. Apparent angular sizes of discrete radio sour Observations at Jodrell Bank, Manchester, 1337
Brown, R. J. S., Freier, G. D., Holmgren, H. Stratton, W. R. and Yarnell, J. L. Differen cross section measurements for the scattering of p tons by deuterons, 272
Brown, S. L. *See* Schwetman, H. D., 6382
Brown, W. F., Jr. Green's "correction" of Yv dielectric constant formula, 6751. Dielectric c stant theory for polar liquids, 7655. Magnetic ene formulas and their relation to magnetization the 8576
Brown, W. L. *n*-Type surface conductivity on *p*-t germanium, 7669
Brown, W. L., Fletcher, R. C. and Machlup, Annealing of bombardment damage in solids, 6
Brown, W. R. J. The effect of field size and chrom surroundings on color discrimination, 1307
Brownell, G. L., Cavicchi, R. V. and Perry, K. An electrical analog for analysis of compartme biological systems, 8820
Broxon, J. W. New barometric and tempera coefficients for the frequency of small cosmic bursts, 7771
Broyles, A. A. *See* Barfield, W. D., 633
Broyles, C. D., Thomas, D. A. and Haynes, S. K. measurement and interpretation of the *K* Auger tensities of Sn^{113}, Cs^{137}, and Au^{198}, 2677
Bru, L., Perez Rodriguez, M. and Cubero, M. Ap cation of Eller's optical machine to the determ tion of the molecular structure of gases by elec diffraction. II. Nonrigid molecules, 1825
Bruce, C. F. Effects of the evaporation technique optical glass, 173
Bruce, C. F. and Cuninghame, W. A. F. The cali tion of standards of angle by interferometry, 29

ce, C. F. and Findlay, V. R. A spectrograph unit for use with the N.P.L. gauge interferometer, 8344
ce, J. M. *See* Bell, J. S., 4925
cer, M., Pollard, W. G., Leiter, H. and Scarf, H. Shaped sources for teletherapy units, 4536
ck, H. On the technique of monochromatization of an ion beam from an accelerator, 6854
ck, H. A. and Jackson, D. A. An attempt to measure interferometrically the widths of chromospheric lines at the total solar eclipse of 25 February, 1952, 2913
ck, L. The behaviour of an electron beam at entry to a coaxial magnetic field, 4845
cker, G. J. Energy dependence of scintillating crystals, 2376
eckner, K. A. Multiple scattering corrections to the impulse approximation in the two-body system, 2206. The elastic scattering of pions in deuterium, 5857. Radiative corrections to nuclear forces in pseudoscalar theory, 8237
eckner, K. A., Gell-Mann, M. and Goldberger, M. On the damping of virtual nucleon-pair formation in pseudoscalar meson theory, 4613
eckner, K. A. and Watson, K. M. The construction of potentials in quantum field theory, 4616
hn, J. *See* Bak, B., 4715–16
jkl, A., Hernegger, F. and Hilbert, H. On the knowledge about new α-rays occurring in nature, 399
jn, J. Inspection of the rods in JEEP during the period 1st–7th December, 1952, 7940
jne, U. and Lindner, R. Application of radioactive indicators to investigations on powder reactions in systems of silicates, 5158
jne, W. Contributions on colour development. VI. On the oxidation of colour developers by silver bromide in an emulsion, in the absence of colour couplers, 2136. *See also* Meyer, K., 2135
uner, H. D. and Perkinson, J. D., Jr. A comparison of iodine-131 counting methods, 1044
uner, J. A. *See* Bromley, D. A., 2697; Fulbright, H. W., 1122
usin, I. Ya., Gorelik, G. S. and Pikovskii, S. A. Investigation of vibrations, very small in comparison with the wavelength of light, by means of an harmonic analysis of the modulated interference picture, 5418
uzek, A. The cause of sudden disappearance of [solar] filaments, 1342. The propagation of [solar] eruption-activity, 1343. The localization of Bartel's *M*-regions, 2911
yant, J. and Michaelis, M. The measurement of micro-microcurie amounts of radon by a scintillation counting method, 2639
be, R. H. Electronic transitions in the luminescence of zinc sulfide phosphors, 4030. Surface photoconductivity in cadmium sulphide crystals, 8425
be, R. H. and Larach, S. Luminescence and trapping in phosphors containing gallium, 1545*
blik, A. I. and Pines, B. Ya. The application of fine-focus X-ray tubes for impulse work, 2068. An X-ray tube with an especially long and fine linear focus and certain of its applications, 2069
chanan, J. S. *See* Astbury, J. P., 4384, 5718
chanan, T. J. Resonance absorption in liquid methyl palmitate and methyl stearate in the microwave region, 4712
chheim, W. On the evaluation of geoelectric depth soundings by an integral equation method, 5790
ck, W. L. *See* Swank, R. K., 7592
ckens, F. Determination of thermo-elastic stresses in a cylindrical tube, 5994
ckingham, M. J. The interaction of electrons with lattice vibrations: radiation by a fast electron, 6980
dden, K. G. The propagation of a radio atmospheric. II, 1788. The theory of the limiting polarization of radio waves reflected from the ionosphere, 1791. The propagation of very low frequency radio waves to great distances, 7804
der, E. E., Ruddick, J. J. and Weber, A. H. The photoemission of tungsten in the region of predicted Schottky deviations, 7680
dini, P. On the ionization and energy loss of a relativistic ionizing particle in polarizable material, 3387. Energy loss and Čerenkov radiation of a relativistic ionizing particle, 4142. Nuclear capture of the μ-meson, 4339
Budini, P. and Lanza, G. On the "*N*" component of high-energy cosmic rays, 1713
Budnevich, S. S. and Deryagin, B. V. On the sliding of hard bodies on ice, 6278
Budó, A. On the theory of dielectric relaxation in dipole liquids, 2436. *See also* Kovács, I., 2335, 7561
Budўnskiĭ, M. M. On the depth of the output of secondary electrons, 5520
Bueche, A. M. Stress relaxation in elastomers, 4454. *See also* Lawton, E. J., 7254
Bueche, F. Light scattering by pure [solid] polystyrene, 782. Viscosity, self-diffusion, and allied effects in solid polymers, 1963. The effects of interactions in real polymer chains, 2602. Bulk viscosity of the system polystyrene/diethyl benzene, 3900
Bueche, F., Cashin, W. M. and Debye, P. The measurement of self-diffusion in solid polymers, 1965
Buechner, W. W. *See* Ajzenberg, F., 7915; Enge, H. A., 1123; Sperduto, A., 1120; Watson, H. A., 1914
Buehler, E. *See* Teal, G. K., 858
Bueren, H. G. van. *See* van Bueren, H. G.
Buess, R. *See* Prigogine, I., 2247, 4645
Bugosh, J. *See* Dietrick, H., 5749–50
Bulanova, A. I., Mikhnevich, M. H. and Peretts, V. B. On the question of determining the retentivity of non-uniformly magnetized specimens, 6147
Bull, L. Optical arrangement for the recording of high frequency cinematograph images, 2134
Bullard, E. C. British standard of radioactive iodine (^{131}I), 1045
Bullen, F. P., Head, A. K. and Wood, W. A. Structural changes during the fatigue of metals, 4426
Bullen, K. E. On density and compressibility at pressures up to thirty million atmospheres, 8805
Bullen, K. E. and Burke-Gaffney, T. N. Detection of *S* waves in the Earth's inner core, 556
Bulliard, H. *See* Aigrain, P., 4812
Bullock, B. W., Feazel, C. E., Gloersen, P. and Silverman, S. The flame emission spectrum of HBr, 739
Bullock, B. W. and Silverman, S. Spectral and pressure observations of explosion phenomena, 5152
Bullough, K. *See* Almond, M., 7394
Bulthuis, H. W. *See* Blaisse, B. S., 4050
Bunbury, D. StP. The β-decay of Li^8, 7091
Buneman, O. Circulation in the flow of electricity: Dirac's new variables, 2191
Bunker, A. F. Measurements of the vertical water vapor transport and distribution within unstable atmospheric ground layers and the turbulent mass exchange coefficient, 3772
Bunker, M. E. *See also* Ames, D. P., 7077; Knight, J. D., 7874
Bunker, M. E., Prestwood, R. J. and Starner, J. W. Scintillation study of As^{77} and Br^{77}, 8653
Burbank, R. D. The use of low temperatures in accurate structure analysis, 8075
Burbank, R. D. and Bensey, F. N. The structures of the interhalogen compounds. I. Chlorine trifluoride at -120°c, 4265
Burbidge, E. M. *See also* Burbidge, G. R., 2157, 8197
Burbidge, E. M. and Burbidge, G. R. [Conf. rep.]. The abundances of the elements, 6437
Burbidge, G. R. *See also* Burbidge, E. M. [Conf. Rep.], 6437
Burbidge, G. R. and Burbidge, E. M. The equation of transfer and the residual intensities in spectrum lines, 2157. The outer atmospheres of some Be stars, 8197
Burbidge, G. R. and de Borde, A. H. The mesonic Auger effect, 1945
Burbury, D. W. P. and McLaren, A. C. Cosmic ray asymmetry studies at Hobart, Tasmania, 1727
Burch, J. M. Scatter fringes of equal thickness, 7612
Burch, P. R. J. Specific γ-activity, the branching ratio and half-life of potassium-40, 8650
Burcham, J. N. A variable temperature and humidity oven, 8753
Burcham, W. E. The range-energy relation for protons of intermediate energy in air, 5528
Burd, S. *See* Babcock, H. W., 2158

Bureau, A. J., Laslett, L. J. and Keller, J. M. The pumping speed of a circular aperture in a diaphragm across a circular tube, 1428

Bureau, R. On the sources of atmospherics, 1298

Burg, F. A. W. van den. *See* van den Burg, F. A. W.

Burgess, R. E. Contact noise in semiconductors, 6043. The influence of mobility variation in high fields on the diffusion theory of rectifier barriers, 8418

Burgess, R. E., Kroemer, H. and Houston, J. M. Corrected values of Fowler-Nordheim field emission functions $v(y)$ and $s(y)$, 4832

Burgus, W. H. Radiations of Ce^{143}, 1076

Burgt, C. M. van der. *See* van der Burgt, C. M.

Burgwald, G. M. and Reiffel, L. An improved wide-range radiation instrument, 6191

Burhop, E. H. S. The Auger effect, 1898

Burhorn, F., Griem, H. and Lochte-Holtgreven, W. The generation of magnetic fields in circulating liquid mercury, 8429

Burkardt, L. A., Moore, D. W. and McEwen, W. S. An apparatus for the rapid determination of freezing point diagrams, 6000

Burke, B. F. and Strandberg, M. W. P. Zeeman effect in rotational spectra of asymmetric-rotor molecules, 3998

Burke, E. *See* Friedman, R., 3247, 4441

Burke-Gaffney, T. N. *See* Bullen, K. E., 556

Burkhard, O. The development of ionospheric layers through temperature variations in the atmosphere, 4498

Burkhardt, J. L. Dipole photonuclear reactions and the independent particle model, 7929

Burkowitz, P. Contribution to a scientific basis of single channel sound transmission, 2116; II, 5824; III, 8149

Burns, J. W. *See* Smith, C. S., 2764

Burns, K. and Adams, K. B. Energy levels and wavelengths of the isotopes of mercury-199 and -200, 117

Burnup, T. E. and Bowen, J. H. A pile period or reactivity meter 6234

Burr, J. G., Jr. *See* Skraba, W. J., 8026

Burrill, A. E. Modern techniques in high voltage radiography, 2876

Burrows, K. and Little, C. G. Simultaneous observations of radio star scintillations on two widely spaced frequencies, 7392

Burrus, C. A., Jr. *See* Trambarulo, R., 5644

Burson, S. B. *See* Jordan, W. C., 6199

Burstein, E., Oberly, J. J. and Davisson, J. W. Infrared photoconductivity due to neutral impurities in silicon, 2462

Burton, H. and Suffolk, S. F. A versatile equipment for thermocouple switching using a Post Office type uniselector, 194

Burton, W. K. and Touschek, B. F. Commutation relations in Lagrangian quantum mechanics, 3853. Schwinger's dynamical principle, 8213

Burwell, J. T. and Rabinowicz, E. The nature of the coefficient of friction, 3671

Busala, A. *See* Sette, D., 1457

Busbridge, I. W. *See* Kourganoff, V., 2923

Busch, R. H., Galloni, E. E., Raskovan, J. and Cairo, A. E. Crystal structure of platinum dioxide, 548

Bush, V., Duryee, W. R. and Hastings, J. A. An electric micromanipulator, 8353

Busing, J. R. *See* Lilley, G. M., 7510

Busing, W. R. The design of photoelectric Raman apparatus, 111

Buskirk, A. V. *See* Thompson, R. W., 5720, 7172

Busnel, R.-G. and Picard, D. Relations between the wavelength and the oxidation of potassium iodide by ultrasonics, 2018

Bussey, H. E. *See* Birnbaum, G., 2858

Busso, R.-H. *See* Prudhomme, R.-O., 2267

Bustamante, E. Elementary particles at rest, 598

Bustraan, M. *See* Bogaardt, M., 7941

Butcher, P. N. A variational formulation of the multi-stream electrodynamic field equations, 7436

Butement, C. A. and Shillito, R. Radioactive gold isotopes, 1868

Butement, F. D. S. The spectrum of the radiation emitted during μ-meson capture by carbon, 5694

Butenuth, G. *See* Glemser, O., 5137

Buteux, R. H. Examination of surfaces by X-ray reflection, 7977

Butler, C. C. *See* Armenteros, R., 7956; Bark K. H., 1930; Rochester, G. D., 8488; Wils J. G., 1746

Butler, C. P. *See* Curcio, J. A., 2851

Butler, J. A. V. [Ed.]. Electrical phenomena at in faces, 866

Butler, S. F. J. Note on Stokes's stream function motion with a spherical boundary, 3904

Butler, S. T. Stripping and the nuclear shell mo 1027

Butler, S. T. and Salpeter, E. E. Stripping and pick differential cross sections, 442

Butler, W. A. and Almy, G. M. Photoprotons fr Mo^{100} and Mo^{92}, 7144

Butschin, M. N. Friction and lubrication of surfa at low temperatures, 7225

Butt, D. K. The efficiency of the anthracene scinti tion counter for low energy electrons, 4878

Buttlar, H. v. *See* v. Buttlar, H.

Buttler, W. M. On the surface layer noise of se conductors, 4806. On the surface layer noise of C single crystals, 4807

Button, J. C. E. and Davies, A. J. Apparatus for au matically recording the absorption of oxygen, 87

Button, K. J. Nuclear cross section for 37-MeV po tive pions in Pb, 1149

Button, P. A. *See* Stamm, R. F., 7614

Butuzov, V. P. *See also* Belov, N. V., 2083

Butuzov, V. P., Gonikberg, M. G. and Smirnov, S Measurement of the melting temperature of met at very high pressures, 8358

Buyle-Bodin, M. *See also* Ayant, Y., 5637

Buyle-Bodin, M. and Monfils, A. On the elec quadrupole resonance of chlorine in Cl$_2$Hg, 5638

Bye, J. A. W. van der Does de. *See* van der Does Bye, J. A. W.

Byrne, J. *See* Meissner, H. P., 496

Byutner, É. K. *See* Vol'kenshteĭn, M. V., 5429

Cabannes, H. Study of the curvature at the tip of attached shock wave in non-stationary plane fl 660. Method for the determination of detac shock waves in stationary flows, 6514

Cabrera, N. Macroscopic spirals and the dislocat theory of crystal growth, 7280

Cade, R. Some electrostatic and steady-current pr lems involving anisotropic bodies, 6744

Cadle, R. D. and Schadt, C. Kinetics of the gas ph reaction between acetylene and ozone, 3675

Cadorin, D. On the electron component of cos radiation in the atmosphere deriving from the de of neutrettos [π°-mesons], 8508. *See also* Bassi, 7770

Cady, W. G. Graphical aids in interpreting the p formance of crystal transducers, 6564

Caffyn, J. E. and Underwood, R. M. A simple l frequency double-flash stroboscope, 6691

Cagniard, L. Principle of the magneto-telluric meth a new geophysical prospecting method, 8806

Cahill, J. M. and Mueller, C. R. The distortion inner shell electrons, 8627

Cahn, R. W. The preparation of uranium crystals, 51 A precision back-reflexion microbeam X-ray cam with provision for pre-selecting the irradiated ar 7304

Caianiello, E. R. Fermion types and ensuing selecti rules, 1382. Universal Fermi-type interaction, 38 III, 7451

Caianiello, E. R. and Fubini, S. On the algorithm Dirac spurs, 7442

Caimann, V. and Hoppe, W. The calculation of Fou series of one or more dimensions with a mechan synthesizer of new construction, 6374

Caird, R. S. *See also* Smith, A. B., 398

Caird, R. S. and Mitchell, A. C. G. The iso Rb^{84m}, 2659

Cairo, A. E. *See* Busch, R. H., 548

Calderwood, J. H. and Cooper, R. Variation of electric strength of KCl and NaCl crystals w temperature, 3342

Calderwood, J. H., Cooper, R. and Wallace, A. An experimental investigation of factors influenc the electric strength of potassium chloride cryst 1620, 6759

AUTHOR INDEX

dirola, P. and Gulmanelli, P. A new wave equation for a particle of spin ½, 7441

dwell, D. O. Evaluation of range straggling for heavy particles, 274. Nitrogen in metals, 483

dwell, D. O. and Armstrong, J. R. Uniform, non-hydrogenous, screens of ZnS-type phosphors, 148

dwell, R. L. *See* Yost, W. J., 3762

igo, D. Analytical and numerical complements to the study of vibrating rods. II, 667

laway, D. B. and Lemmerman, R. D.* A comparison between model study tests and field measurements on an aircraft test-cell silencer, 5355

laway, D. B., Tyzzer, F. G. and Hardy, H. C. Techniques for evaluation of noise-reducing piping components, 716

laway, J. *See* Herman, F., 3475

len, H. B. *See also* Greene, R. F., 1595; Offenbacher, F. L., 4824

len, H. B., Barasch, M. L. and Jackson, J. L. Statistical mechanics of irreversibility, 1399

nan, E. A. *See* Vernon, W. H. J., 4456

lvet, E. Adaptation of a four-element microcalorimeter to thermo-gravimetric adsorption measurements, 4770

mac, M. Pair production by electrons, 903. The characteristics of the synchrotron beam, 4134

mac, M., McGuire, A. D., Platt, J. B. and Schulte, H. J. X-rays from mesic atoms, 1020

mbel, A. B. *See* Schneider, P. J., 6381

meron, A. G. W. *See* Haslam, R. N. H., 2706, 7925; Millar, C. H., 7142

meron, J. F. The use of Tl^{204} in radioactive static eliminators, 7649

meron, J. R. Elastic scattering of alpha-particles by oxygen, 6224. *See also* Jackson, H. L., 2688

mnitz, H. G. *See* Noyes, H. P., 1905

mp, L. Broad band directional barium titanate transducers, 3056

mpbell, C. G. *See* Kyles, J., 7090

mpbell, F. W. *See* Styles, R. S., 4505

mpbell, I. J. Wave motion in an annular tank, 7488

mpbell, J. G. and Boyle, A. J. F. Energy resolution of γ-radiation up to 18 MeV by sodium iodide scintillation counters, 6109

mpbell, J. S. and Welch, D. F. Graphical analysis of cloud-chamber photographs, 2507

mpbell, L. L. *See* Wait, J. R., 4232

mpbell, R. *See* Franklin, A. D., 7974

mus, J. *See* Harrison, G. R., 109

nac, F. Interference between two ultrasonic beams reflected by a plane wall. Condition of waves, 3061. Measurement of the reflection of ceilings by means of ultrasonics, 4674

ndler, C. Modern interferometers, 4042

nnon, C. G. Infra-red spectra of coals and coal products, 3129

nody, L. J., Harris, T., Jr and Woodruff, J. F. The influence of varying amounts of elements in steel and cast irons on spectral intensity, 2802

nton, H.-J. *See* Schulz, G. V., 3089

p, F. On the static interaction of leptons due to a de Broglie field, 1381. On the general theory of relativity and unified field theory, 2172. On the mass of the photon, 5293

pildeo, R. Modified Newtonian systems, 1365

ppeller, U. The binding energies and masses of the nuclei $A = 17$ to $A = 32$, 2613

ppeller, V. The reproduction of voltage impulses with a proportional amplifier, 6892

pps, W. Viscosity of glass, 2226

racciolo, F. B. Curvilinear light sources, 6585

rbenay, F. Correspondence between the mean level of atmospherics and the degree of intelligibility of a radio link on kilometre-waves, 982

rdoso, J. C. Studies of electrical conductivity in liquid hydrocarbons, 2457

reri, G. Note on the rate of recombination of free atoms, 5615. *See also* Boato, G., 4297

retto, A. A., Jr and Katcoff, S. Short-lived cerium isotopes from uranium fission, 4370

rhart, R. R. *See* Epstein, P. S., 5344

rio, G. and Stille, U. Excitation and duration of the "auroral afterglow" in nitrogen, 1508

rlander, O. *See* Hedvall, J. A., 5203

Carlbom, L. Determination of the diffusion length of thermal neutrons in graphite, 5119

Carlson, R. R. *See* Kington, J. D., 3537

Carmo Anta, M. do. *See* do Carmo Anta, M.

Caro, D. E. *See also* Hibbard, L. U., 91

Caro, D. E. and Hibbard, L. U. A wide range oscillator of high stability, 1770. Oscillator switching for variable frequency synchrotron control, 8453

Caro, D. E. and Martin, L. H. Velocity sound in air at low pressures, 8288

Carothers, J. and André, C. G. The ratio of positive to negative π-meson production from deuterium, 1938

Carr, H. Y. and Purcell, E. M. Interaction between nuclear spins in HD gas, 357

Carhart, R. R. Reflection of sound in the ocean from temperature changes, 6567

Carmichael, H. Design and performance of a fused silica microbalance, 6502

Carrelli, A. and Rescigno, L. Measurements of high-frequency conductivity in viscous solutions, 8013. Measurement of conductivity of strong and weak electrolytes at high frequency, 8014

Carrelli, A. and Tartaglione, E. Diffraction of X-rays by aqueous solutions of caramel sugar, 4412

Carrière, P. New idea relating to the design of supersonic tuyères for blowers, 662

Carroll, P. K. *See* Sayers, D., 8316

Carroll, T. J. Tropospheric propagation well beyond the horizon, 4930

Carruthers, N. *See* Brooks, C. E. P., 4495

Carstensen, E. L., Kam Li, and Schwan, H. P. Determination of the acoustic properties of blood and its components, 3040

Cartwright, W. F. *See also* Oxley, C. L., 7730

Cartwright, W. F., Richman, C., Whitehead, M. N. and Wilcox, H. A. The production of positive pions by 341-MeV protons on protons, 7954

Carvalho, H. G. de. *See* de Carvalho, H. G.

Carver, J. H., Edge, R. D. and Wilkinson, D. H. The cross section for Ta^{181} $(\gamma, 2n)Ta^{179}$ at 17·6 MeV, 2709. The reaction $^{181}Ta(\gamma, 2n)^{179}$ Ta at 17·6 MeV and some remarks on nuclear photodisintegration, 7926

Casassa, E. F. *See* Stockmayer, W. H., 68

Casey, J. P., Jr and Lewis, E. A. Interferometer action of a parallel pair of wire gratings, 1560*

Cashin, W. M. *See* Bueche, F., 1965

Caskey, F. E. and Drickamer, H. G. Thermal diffusion in isotopic mixtures in the critical region, 2251

Caspary, R. and Müser, H. Photoconductivity of cadmium sulphide crystals at high temperatures, 4811

Cassanas, F. and Barchewitz, P. An automatic electron trajectory tracer, 895

Cassels, J. M. *See* Dickson, J. M., 1703; Randle, T. C., 7914

Cassignol, C. A practical method for the correction of angular aberration in mass spectrometry, 5526

Casson, H. Nuclear gamma-rays from low energy proton bombardment of sodium, magnesium, and aluminium, 2672. *See also* Allison, S. K., 5976

Castagnoli, C. *See* Amaldi, E., 4194, 7781

Castillo, G. Del. *See* Del Castillo, G.

Castner, S. V. and Templeton, D. H. Some neutron deficient strontium isotopes, 1057

Cauchois, Y. Preliminary remarks on the L spectrum, the conductivity band and the colour of silver, 879. The L spectra of nickel and copper, 4131. Some results on X-ray spectroscopy: from the colour of silver to the electron structure of the "actinides," 5495. The K emission spectrum of aluminium in the conductivity band region, 7707.

Caulton, M. The measurement of distortion of nuclear emulsions, 8168

Caunt, A. D. *See* Barrow, R. F., 3992, 6614, 6641

Cavallo, L. *See* Seliger, H. H., 4986

Cavanagh, P. E. The double Compton effect, 419

Cavicchi, R. V. *See* Brownell, G. L., 8820

Ceccarelli, M., Dallaporta, N., Merlin, M. and Rostagni, A. Observation of a τ-meson, 1145. A new example of τ meson, 2734

Ceccarelli, M. and Zorn, G. T. On the angular correlation of the products of nuclear disintegrations, 8671

Cennamo, F. Diffraction of X-rays by naphthalene in the solid state and in the liquid state, 1266. Diffraction of X-rays in liquids, 8265
Cerf, R. On the theory of the Brownian deformation, 652. Variation of the specific viscosity of a solution of rigid macromolecules with frequency, 1405. On the theory of Maxwell's effect: effect of fluctuations of molecular form. Application to the determination of the structure of nucleic acids in solution, 2250
Cerfontain, H. *See* Aten, A. H. W., Jr, 3584; Nussbaum, R. H., 7071
Cerrai, E., Marchetti, C. and Silvestri, M. Measurement of the deuterium concentration of water condensed from a Larderello borax spring, 1854. Application of a float method to rapid D_2O concentration measurement in heavy water aqueous solutions, 1855
Cevolani, M. *See* Petralia, S., 4667
Chabbal, R. *See* Brochard, J., 1498
Chackett, K. F., Fremlin, J. H. and Walker, D. Nuclear reactions produced by fast nitrogen ions, 8673
Chagnon, P. R., Madansky, L. and Owen, G. E. A fast neutron coincidence spectrometer, 8707
Chalklin, F. C. *See* Tait, R. I., 8306
Challande, R. Application of β-irradiation and -emission to the study of the electrical precipitation of spherical particles (microscopic and submicroscopic), 8031. *See also* Pauthenier, M., 1973, 3640
Challice, C. E. and Sutton, C. D. The production of specimen mounting grids for the electron microscope, 1975
Chalmers, B. The preparation of single crystals and bicrystals by the controlled solidification of molten metals, 2047. *See also* Rutter, J. W., 2046; Teghtsoonian, E., 7273; Weinberg, F., 7274; Winegard, W. C., 7195
Chalmers, B. [Ed.]. Progress in metal physics, 3779
Chalmin, R. Use of a solar energy accumulating furnace for dilatometric studies, 6707
Chalonge, D. *See also* Berger, J., 11
Chalonge, D. and Divan, L. Researches on the continuous spectra of stars. V, 2916
Chalvet, O. and Daudel, R. Calculation of the ground-state energy and of the ionization potentials of certain ions, free radicals and molecules, by the method of configuration and interaction. Evaluation of the heats of activation of certain reactors which these same quantities give, 998
Chalvet, O. and Vroelant, C. The calculation of interatomic distances, 7018*
Chalyĭ, V. P. An X-ray investigation of the structure of friable cathode deposits of metals, 7980
Chamberlain, A. C. Experiments on the deposition of iodine 131 vapour onto surfaces from an airstream, 8269
Chamberlain, G. H. N. and Walsh, A. D. The inhibiting effect of lead tetraethyl. I. The effect of lead compounds on the vapour phase slow oxidation of di*iso*propyl ether and on the ignition of diethyl ether, 2004
Chamberlain, J. *See* Dodson, H. W., 3809
Chamberlain, J. W. Collisional excitation of hydrogen in a gaseous nebula, 8195. The excitation of the network Nebulae, 8196. *See also* Oliver, N. J., 8818
Chamberlain, J. W. and Oliver, N. J. OH in the airglow at high latitudes, 6333
Chambers, L. G. Calculation of the propagation constants of an inhomogeneously-filled waveguide, 1783. Propagation in waveguides filled longitudinally with two or more dielectrics, 3453
Chambers, R. G. The two-band effect in conduction, 1629. The anomalous skin effect, 2458. The effect of relaxation on microwave measurements of the anomalous skin effect, 6786. *See also* Pippard, A. B., 2444
Chambers, R. G. and Pippard, A. B. The effect of method of preparation on the high-frequency surface resistance of metals, 4400
Chambré, P. L. On the solution of the Poisson–Boltzmann equation with application to the theory of thermal explosions, 1207
Chaminade, R. *See* Berthelot, A., 7089; Koicki, S., 7069
Champeix, R. *See* Morilleau, E., 4880
Champier, G. *See* Taurel, L., 7613
Champion, K. S. W. The energy balance equation the positive columns of high pressure arcs, 3340
Chandrasekhar, B. S. and Mendelssohn, K. Su flow of helium ii through compressed powder, 6
Chandrasekhar, S. The thermal instability of a f sphere heated within, 1574. The stability of visc flow between rotating cylinders in the presence magnetic field, 3905. The onset of convection thermal instability in spherical shells, 4053. instability of a layer of fluid heated below subject to Coriolis forces, 4762. The onset of c vection by thermal instability in spherical shel (A correction), 8356
Chang, C. C. and Werner, J. A solution of the t graph equation with application to two-dimensio supersonic shear flow, 3
Chang, C. H. The spontaneous magnetization of a t dimensional Ising model, 3427
Chang, C. H., Cook, C. S. and Primakoff, H. transmission of electrons through thin metallic f 4835
Chang, T.-S. and Dennison, D. M. Centrifugal tortion effects in methyl chloride, 7820
Chang, W. Y., Del Castillo, G. and Grodzins Further results from the study of sea-level penetra showers, 2525
Chanmugam, J. and Ashmore, P. G. The hydrog oxygen reaction sensitized by nitrosyl chloride, 2
Chanson, P. *See also* Price, B. T., 3407
Chanson, P., Treille, P., Price, T. and West, Experimental verification of theories of ioniza produced in gases by high-energy mesons, 2530
Chantrel, H. *See* Blaise, J., 5659; Brochard, J., 1
Chapanis, A. *See also* Halsey, R. M., 572
Chapanis, A. and Halsey, R. M. Photopic thresh for red light in an unselected sample of co deficient individuals, 2863
Chapelle, J. and Galy, A. Considerations on Raman spectrum provided by the water in hydra crystals, 6663
Chapiro, A. Spatial distribution of free radicals for during radiation-chemical processes, 8739. *See* Corval, M., 2025
Chaplin, R., Chapman, P. R. and Griffith, R. Electrical properties of chromium-oxide–alu catalysts, 8412
Chaplin, T. K. *See* Meyerhof, G. G., 3661
Chapman, J. H. A study of winds in the ionospher radio methods, 2097
Chapman, P. R. *See* Chaplin, R., 8412
Chapman, R. M. *See* Howard, J. N., 759
Chapman, S. and Cowling, T. G. The mathema theory of non-uniform gases, 7512
Charakhch'yan, A. N. *See* Vernov, S. N., 7773
Charette, J. and de Hemptinne, M. Infrared spect of deuterosubstituted vinyl bromides, 4708
Charette, J. and Manneback, C. The potential f tion of ethylene, 4248
Chari, S. S. *See* Parthasarathy, S., 1454, 2269, 3 3948, 5920–1, 6558, 7528–9, 8284, 8291–2
Charlesby, A. Cross-linking of polythene by pile ra tion, 2022. Effect of high-energy radiation on l chain polymers, 2789. Ionic current and growth of thin oxide layers on aluminium, 5 Electron currents in thin oxide films on alumini 6772. Comparisons of equations of state for an phous long-chain polymers, 8751. *See also* R M., 8740
Charlesby, A. and Hancock, N. H. The effec cross-linking on the elastic modulus of Polyth 7211
Charlesby, A. and Ross, M. The effect of cross-lin on the density and melting of Polythene, 4455
Charlesworth, M. J. *See* Opler, A., 6682
Charlwood, P. A. *See* Warren, R. L., 3323
Charnley, A., Isles, G. L. and Townley, J. R. direct measurement of the isothermal Jo Thomson coefficient for gases, 6550
Charpak, G. Experimental study of the double io tion of the *K* shell of Mn^{55} in the disintegratio Fe^{55} by *K*-capture, 8659. *See also* Suzor, F., 5
Charpie, R. A. *See* Biedenharn, L. C., 1118; B G. E., 1060

ARTRES, B. A. *See* GREEN, H. S., 1735
ARWAT, A. F. *See* GROSSMAN, L. M., 1411
ASE, R. L. *See* BERNSTEIN, W., 6113
ASMAR, R. P. *See* BROWN, D. A. H., 6733
ASSON, R. L. Effects of the atmosphere on the penetrating cosmic radiation, 4183
ASSON, R. L. and MACKNIGHT, M. L. Ethylene and ethyl alcohol as quenching agents in external-cathode Geiger counters, 3375
ASTEL, R. Study of photodisintegrations. I. Historical and bibliographical survey of the study of photodisintegrations, 5705; II. Some experimental results on photodisintegrations and their comparison with various theories, 5706. Measurement of the intensity of the gamma radiation produced by the reaction $_3$Li^7 (p, γ) $_4$Be^8 with a 600 KeV accelerator, 7913. *See also* VIGNERON, L., 8165
ATEL, S. *See* KOZAKEVITCH, P., 8260
ATTERJEE, A. *See* BOSE, H. N., 3163
ATTERJEE, B. Effect of magnetic field in oblique propagation over equatorial region, 4233
ATTERJEE, S. and KUMAR SAHA, A. γ–γ angular correlation measurements, 7894
ATTERJEE, S. K. Propagation of microwaves through a cylindrical metallic guide filled coaxially with two different dielectrics, 5586
AUCHEFOIN, P. *See* DOUCET, Y., 814
AUDHURI, A. K. Scattering of electrons and contrast in the electron-micrographs of shadow-cast specimens, 3641
AUDHURI, K. D. and DAS GUPTA, D. R. On the molecular conductivity of dyestuffs in solution and the influence of foreign substance on the same, 2783
HAUDHURY, M. L. Geiger–Nuttall relation and α-ray spectra, 401. Systematics of alpha ray spectra, 1876. On the new theory of alpha-decay, 3557
HAUDRON, G. *See* BOURRAT, J., 2539
HAUME, G., GUILLAUME, J. and MATHIEU-SICAUD, A. Exposure meter for the electron microscope, application to choice of developer, 8830
HAVCHANIDZE, V. V. On a new method of determining the masses of charged particles by means of photo-emulsions. I, 5531
HEMLA, M. Diffusion and migration of ^{137}Cs$^+$ in single crystals of NaCl, 5160
HEMLA, M. and SUE, P. Isotope enrichment by migration in a solid subjected to an electric field, 7853
H'EN, S.-Y. and KOHLER, D. A. Broadening and shift of the second doublet of the rubidium absorption series under different pressures of argon and helium, 5956
HEN, T. C. and LONDON, F. The entropy of liquid He^3, 3254
HENG, L. S. *See also* ELLIOTT, M. W., 403; HASKINS, J. R., 1075
HENG, L. S., DICK, J. L. and KURBATOV, J. D. Beta-spectra of Co^{56}, Co^{57}, and Co^{58}, 1067
HENG, L. S. and POOL, M. L. The disintegration of Sc^{47}, 6200
HEPELEVETSKIĬ, M. L. An attempt to construct the periodic system of atomic nuclei, 6187
HERENETSKIĬ, A. V. *See* REĬKHRUDEL', É. M., 6065
HERKASOV, I. I. The relationship between the Poisson coefficient and the plastic properties of substances, 6264
HERNOV, L. A. *See* MICHURIN, V. K., 1465
HERN'YĬ, B. K. *See* SINYAKOV, B. K., 3290
HERRY, T. M. A transformation of the hodograph equation and the determination of certain fluid motions, 3024. Tables and approximate formulae for hypergeometric functions, of high order, occurring in gas-flow theory, 4654
HERTOCK, G. The flexural response of a submerged solid to a pulsating gas bubble, 3033
HESTER, P. F. and JONES, G. O. A miniature helium liquefier-cryostat of cascade type, 4766
HESTER, W. The reflection of a transient pulse by a parabolic cylinder and a paraboloid of revolution, 684
HESTERMAN, W. D. The dynamics of small transient cavities, 1412
HESTERMAN, W. D. and PECK, G. T. A synchronized flash-discharge system for high-speed 35 mm. cinematography, 2888
HESTON, W. B. *See* GALLAHER, L. J., 1121
CHEVALIER, M. The change of refractive index of glycerine as a function of temperature, 6597
CHEVALLIER, R. *See* BIZETTE, H., 7794
CHEVET, A. Preliminary research on the infra-red absorption spectra of silica gels, 7563
CHEW, G. F. Pion-nucleon scattering when the coupling is weak and extended, 2203. *See also* BLAIR, J. S., 5859
CHHAPGAR, A. F. Dispersion of ultrasonic velocity in sodium acetate solutions, 6555. Ultrasonic velocities in solutions and mixtures, 6556. *See also* PARTHASARATHY, S., 2440, 3944, 7533, 8279, 8283, 8293
CHI YUAN PAN and NIELSEN, J. R. Normal coordinate analysis of CF$_3$CH$_3$ based on a Urey–Bradley potential function, 7821
CHIAROTTI, G. and GIULOTTO, L. Nuclear signals dependence on the radiofrequency field and paramagnetic catalyst, 7839
CHIBA, R. *See* TAKEMOTO, S., 8683
CHICK, D. R. *See also* FIRTH, K., 4864; MIRANDA, F. J., 910
CHICK, D. R. and MIRANDA, F. J. A demountable accelerator tube, 909
CHIEN CHOU. *See* WHITE, D., 805
CHILDERS, C. W. *See* WALL, F. T., 3006
CHILDS, E. C. The measurement of the hydraulic permeability of saturated soil *in situ*. I. Principles of a proposed method, 2750
CHILDS, E. C., COLE, A. H. and EDWARDS, D. H. The measurement of the hydraulic permeability of saturated soil *in situ*. II, 3634
CHILES, J. R., JR. *See* MCLOUGHLIN, R. C., 5933
CHIPPENDALE, R. A. Image converter techniques applied to high speed photography, 2887
CHIPPINDALE, P. *See* ASTBURY, J. P., 1931, 4384
CHISHOLM, D. A., MACDONALD, J. C. F., CRAWFORD, M. F. and WELSH, H. L. Induced infrared absorption in hydrogen and hydrogen foreign gas mixtures at pressures up to 1500 atmospheres, 754
CHISHOLM, R. and TOUSCHEK, B. Spin orbit coupling and the mesonic Lamb shift, 6172
CHOMSE, H., HOFFMANN, W. and SEIDEL, P. Visible indication of heat and ultrasonic radiation by means of organic phosphors, 8333
CHOU, C. N. Saturation effect of plastic scintillators, 154. The nature of the saturation effect of fluorescent scintillators, 155. Energy spectra of cosmic-ray photons and electrons from plastic scintillation counter measurements, 4894
CHOU CHIEN. *See* CHIEN CHOU
CHOUDHURY, D. C. Production of the *E*-layer in the oxygen dissociation region in the upper atmosphere, 563
CHOUDHURY, N. K. *See* GANGULY, S. C., 3160, 6653
CHOWDARY, S. A. *See* BLEULER, E., 4996
CHRAPLYVY, Z. V. On definitions in the teaching of physics, 590. Reduction of relativistic two-particle wave equations to approximate forms. I, 6486. *See also* BARKER, W. A., 2192*
CHRIST, C. L., CLARK, J. R. and EVANS, H. T., JR. The crystal structure of KVO$_3$.H$_2$O, 7333
CHRISTENSEN, M. T. An adjustable slit for a vacuum spectrograph, 3098
CHRISTENSEN, W. R., SOMMERS, S. C. and SPALDING, C. K. Effect of soft roentgen rays on the rabbit skin, 2860
CHRISTIAN, J. W. *See* ANANTHARAMAN, T. R., 2755, 7308; BASINSKI, Z. S., 8765; HUME-ROTHERY, W., 482
CHRISTIAN, R. S. and GAMMEL, J. L. Elastic scattering of protons and neutrons by deuterons, 7188
CHRISTIAN, S. M. *See* LINDER, E. G., 428
CHRISTIANSEN, J. Self-quenching parallel-plate vapour counters operated at voltages below the static breakdown voltage, 6880
CHRISTIANSEN, W. N. A high-resolution aerial for radio astronomy, 7382
CHRISTIANSEN, W. N. and HINDMAN, J. V. A preliminary survey of 1420 Mc/s line emission from galactic hydrogen, 8
CHRISTIANSEN, W. N. and WARBURTON, J. A. The distribution of radio brightness over the solar disk at a wavelength of 21 centimetres. I. A new highly directional aerial system, 6422

Christie, A. W. The luminous directional reflectance of snow, 7603
Christie, M. I., Norrish, R. G. W. and Porter, G. The recombination of atoms. I. Iodine atoms in the rare gases, 3482
Christorazum, A. A. The length of the molecular chain of *cis*- and *trans*-polydiene, 8631
Christy, R. F. The coupling of angular moments in nuclear reactions, 2684
Chu, E. L. *See* Barber, W. C., 3358
Chuchmarev, S. K. *See* Gel'd, P. V., 5324
Chupka, W. A. *See also* Inghram, M. G., 6866
Chupka, W. A. and Inghram, M. G. Investigation of the heat of vaporization of carbon, 3275. Molecular species evaporating from a carbon surface, 7644
Chuprinin, F. I. Back-reflection high-intensity beam camera for back-reflection photographs with a fine-focus tube, 2071
Church, E. L. *See also* Hill, R. D., 414
Church, E. L. and Kraushaar, J. J. The geometrical correction in angular correlation measurements, 416
Chynoweth, A. G. and Schneider, W. G. Ultrasonic propagation in xenon in the region of its critical temperature, 676
Cini, M. The commutation laws in the theory of quantized fields, 8217. *See also* Bertolini, G., 1730
Citron, A. The barometer effect of large air showers, 3408
Civaoğlu, I. and Erben, T. A generalization of the kinetic theory of Lindemann and Darmois-Sutra concerning the migration of electrolytic ions subjected to a potential gradient, 7246
Cizancourt, H. de. *See* de Cizancourt, H.
Claassen, H. H. *See also* Benedict, W. S., 2351; Nielsen, J. R., 1532; Shaw, J. H., 3812
Claassen, H. H. and Nielsen, J. R. A Raman apparatus for gases, 4730
Claffy, E. W. *See* Schulman, J. H., 4029
Claire, A. D. Le. *See* Le Claire, A. D.
Clapper, F. R. *See also* Williams, F. C., 8173
Clapper, F. R. and Yule, J. A. C. The effect of multiple internal reflections on the densities of half-tone prints on paper, 8156
Clarebrough, L. M., Hargreaves, M. E., Michell, D. and West, G. W. The determination of the energy stored in a metal during plastic deformation, 2767
Clarebrough, L. M., Hargreaves, M. E. and West, G. W. The release of the energy stored in deformed nickel, 8722
Clarion, C. *See* Valensi, J., 1445
Clark, C. A. *See* Sucksmith, W., 8578
Clark, G. L. *See* Goldstein, L., 4929, 5492
Clark, J. R. *See* Christ, C. L., 7333; Weiss, R. J., 1269
Clark, L. B., Sr. Recent developments in the production of halogen-quenched Geiger–Müller counting tubes, 8468
Clark, L. C., Jr, Hooven, F. and Gollan, F. A large capacity, all-glass dispersion oxygenator and pump, 2107
Clark, R. J., Hause, C. D. and Bennett, G. S. Adjustment of Mach–Zehnder interferometer for white-light fringes, 5979
Clarke, A. C. The rocket and the future of astronomy, 7381
Clarke, D. D. *See* Igo, G. J., 3388
Clarke, E. N. Oxygen-induced surface conductivity on germanium, 8407
Clarke, R. L. *See* Paul, E. B., 2723
Clarke, W. W. H. and Jacob, L. Some characteristics of a low voltage electron immersion objective, 4849
Class, C. M. and Hanna, S. S. Angular correlation in the decay of Li^8, 3555
Claude, G. On the utilization of subterranean water above the critical pressure, 5799
Clay, J. The energy spectrum of the soft component of cosmic radiation, 6919. *See also* de Vries, L. J., 3542, 4981
Clay, J., Jongen, H. F. and Aarts, A. J. J. High energy electrons produced in a thunderstorm, 2853
Clay, J., Jongen, H. F., Aarts, A. J. J., Jongejans, B. and Strackee, J. High energy particles from thunderstorms, 4184
Clay, J. and Strackee, J. Latitude effect and asymmetry of cosmic radiation, 4189
Clay, J., Wansdronk, C. and Dekker, T. J. Absorpt of gamma radiation in thick layers of lead and second maximum in the shower curve of cos radiation, 2523
Clearman, H. E. The solar spectrum from λ 2285 λ 3000 Å, 3813
Clegg, J. A. *See* Closs, R. L., 3802
Clegg, P. L. The optical constants of thin meta films deposited by evaporation, 158. *See* Archard, J. F., 168
Cleland, M. R. *See* Bay, Z., 282
Clementel, E. Interaction of π-mesons with nuc matter, 4338
Clementel, E. and Ferrari, F. On the nucleonic co ponent in the atmosphere. II, 7759
Clementel, E. and Puppi, G. Interactions with nu and production of π-mesons, 8498
Clemmons, J. J. and Aprison, M. H. An impro historadiographic apparatus, 7368
Clemmow, P. C. Radio propagation over a flat ea across a boundary separating two different me 4934
Cleveland, F. F. *See* Bernstein, R. B., 1521; Deck C. E., 3120; El-Sabban, M. Z., 753; Ferigle, S. 1525; McGee, P. R., 2591; Pontarelli, D. A., 18 Weber, A., 5635; Ziomek, J. S., 2340
Clewell, D. H., Broding, R. A., Loper, G. B., Hea S. N., Simon, R. F., Mills, R. L. and Dobrin, M Instrumentation for geophysical exploration, 734
Clews, C. J. B. *See* Vernon, W. H. J., 4456
Clifford, D. S., Fortescue, R. L. and Roberts, Failure of vacuum insulation at low field streng 248
Climenhaga, J. L. *See* McKellar, A., 6412
Closs, R. L., Clegg, J. A. and Kaiser, T. R. An perimental study of radio reflections from met trails, 3802
Cluley, J. C. *See* Bell, D. A., 940
Clusius, K. Do all metals become superconducti 6061
Clusius, K. and Schachinger, L. Results of inve gations at low temperatures. X. Atomic heat indium between 12° and 273°K, 6014
Coates, M. S. *See* Armenteros, R., 7956
Cocconi, G. *See also* Barrett, P. H., 1731, 2883
Cocconi, G. and Silverman, A. Production of mesons in hydrogen and deuterium by high ene γ-rays, 1917
Cocconi Tongiorgi, V. *See* Tongiorgi, V. Coccon
Cochet, R. *See* Pauthenier, M., 7365
Cochran, K. E. *See* Middleton, A. E., 828
Cochran, L. W. *See* Jenkins, G. L., 7899
Cochran, W. and Douglas, A. S. A new applicat of EDSAC to crystal structure analysis, 7314
Cockcroft, J. Nuclear reactors and their applicati 5098
Cocks, G. G. and Schwartz, C. M. A cantile microtome for precision sectioning in electron light microscopy, 790
Coester, F. The symmetry of the *S* matrix, 2204
Coester, F. and Jauch, J. M. Theory of angular co lations, 4617
Coffin, E. M. *See* Tannenbaum, E., 2354
Coffin, F. D. and Weiman, A. L. Surface effects the creep of zinc single crystals. I. Creep cha teristics of clean and oxide-coated crystals, 3669
Cohen, A. V. The angular distribution of alpha ticles from the proton bombardment of ^{18}O, 791
Cohen, B. L. Gallium–64, 7078. The theory of fixed frequency cyclotron, 8455
Cohen, B. L., Newman, E., Handley, T. H. and T nick, A. Angular distribution of deuterons fr $Be^9(p, d)Be^8$, 5701
Cohen, E. R. The Rydberg constant and the ato mass of the electron, 205
Cohen, J. *See* Faraggi, H., 2131
Cohen, S. G. *See also* Jaffe, A. A., 2655
Cohen, S. G. and Bauminger, R. A search for natural radioactivity of vanadium, 3541
Cohen, V. W. *See* Kikuchi, C., 380
Cohn, E. M. and Hofer, L. J. E. Some thermal actions of the higher iron carbides, 2777
Cohn, G. I. and Saltzberg, B. Solution of nonlin differential equations by the reversion method, 28
Cojan, J.-L. *See* Lennuier, R., 3105, 5416

AUTHOR INDEX

ding, B. and Erwall, L.-G. Wear studies of irradiated carbide cutting tools, 4432
e, A., Moore, E. B. and Shalek, R. J. A simplified automatic isodose recorder, 7108
e, A. H. *See* Childs, E. C., 3634
e, D. G. *See* Gillam, E., 7978
e, D. P., Duffy, P. A., Hayes, M. E., Lusby, W. S. and Webb, E. L. The phosphor-phototube radiation detector, 924
e, H. Approximate elastic spectrum of acoustic waves in AgCl from X-ray scattering, 4472
e, L. G. and Elverum, G. W., Jr. Thermodynamic properties of the diatomic interhalogens from spectroscopic data, 201
e, R. H. *See* Hassion, F. X., 8391
e, R. W. Exchange magnetic moments of nuclei with almost closed shells of nucleons, 3524
e, T. E. Design of a control system for a low-cost research reactor, 4373
eman, J. H. and Bohm, D. A method for increasing the electrical resistivity of insulators under ionizing radiation, 4810
gate, S. A. and Gilbert, F. C. Electron-positron annihilation in flight, 2681
laday, G. S. *See* Juenker, D. W., 6120
latz, L. and Görtler, H. Tube flow with slight angular momentum, 5879
let, E. *See* Roig, J., 6669
let, L.-H. A modification to the theory of inversion of the Hittorf phenomenon, 8019
let, L.-H. and Pommier, M.-C. Existence of a discontinuity in the cathodic polarization of platinum in the electrolysis of dilute acid solutions, 2013
lette, G. *See* Beaujard, L., 2776
li, L. and De Leonardis, M. T. A measurement of the drift velocity of electrons in the electrical field in argon-alcohol mixtures, 3394
li, L. and Facchini, U. Discharge mechanism in argon counters, 918. Quenching of photons in argon-CO_2 proportional counters, 4876. The mechanism of counter tube discharges in argon, 8466
li, L., Facchini, U. and Gatti, E. Proportional counters in corona region, 917
lin, J. Mass spectra of aliphatic amines, 3392
lins, C. B., Farquhar, R. M. and Russell, R. D. Variations in the relative abundances of the isotopes of common lead, 2093
lins, C. B., Russell, R. D. and Farquhar, R. M. The maximum age of the elements and the age of the earth's crust, 3765
lins, E. R., McKenzie, C. D. and Ramm, C. A. A precise technique for the determination of some nuclear reaction energies, 3589. Energy values for some proton and deuteron reactions with ^{6}Li, ^{7}Li, ^{9}Be, ^{11}B and ^{15}N, 3590
lins, F. C. *See* Frisch, H. L., 1225*
lins, L. E. *See also* Heavens, O. S., 5770
lins, L. E. and Heavens, O. S. The epitaxial growth of germanium on rocksalt, 1239
lins, R. B. and Giles, C. H. Colour photography, 8172
lins, S. C. Helium liquefier, 807
lins, S. C. and Zimmerman, F. J. Cyclic adiabatic demagnetization, 6148
odny, P. *See* Kestigian, M., 5984
ombino, P. *See* Bertolini, G., 1730
ombo, S. Dirac's function and its use in mathematical physics, 4551
onnetti, G. On the value of Poisson's coefficient in elasto-plastic phenomena, 2766
bée, B. *See* Botden, P. J. M., 3344
bes, L. S. *See* Ballard, S. S., 489
brisson, J. *See* Uebersfeld, J., 5571
olet, R. Radial flow of a compressible viscous fluid between two parallel planes, 1407. Experimental study of a radial flow of viscous fluid between two parallel planes, 1410
pton, W. D. *See* Fowler, R. G., 251
sa, J. *See* Grös, C.-M., 8151
ger, R. L. Nuclear magnetic relaxation in viscous liquids, 6141
ieaud, P. Electron diffraction study of the changes in thin films of Sb, As, Bi, obtained by thermal vaporization in the diffraction enclosure, 1974
Conklin, G. L. *See* Mandeville, C. E., 1082, 2657, 3549
Conley, L. L, *See* Davis, W., Jr, 6279
Connally, R. E. Two-crystal gamma-ray scintillation spectrometer, 6110
Connelly, C. M., Bronk, D. W. and Brink, F., Jr. A sensitive respirometer for the measurement of rapid changes in metabolism of oxygen, 8822
Conner, J. P. A cloud-chamber study of the scattering of fast neutrons in oxygen, 2746. *See also* Bonner, T. W., 1117
Conner, J. P., Bonner, T. W. and Smith, J. R. A study of the $H^3(d, n)He^4$ reaction, 1116
Connolly, P. L. and Fox, F. E. Ultrasonic absorption in magnesium sulfate solutions, 5919
Conrad, C. M. and Zifle, H. M. Implications of Philippoff flow curves for the determination of intrinsic viscosity of high polymer nitrocelluloses, 2985
Conway, J. G. *See also* Stover, B. J., 123
Conway, J. G. and Fred, M. Isotope shift in the plutonium spectrum, 3990
Conwell, E. M. Properties of silicon and germanium, 851. Mobility in high electric fields, 1642. High field mobility in germanium with impurity scattering dominant, 6045. *See also* Debye, P. P., 221
Coogan, C. K. and Rees, A. L. G. The nature of the thermal color change in zinc oxide, 758
Cook, A. H. The possibility of comparing line standards of length photographically, 8246
Cook, C. F. and Smith, J. R. Cross section for the reaction $D(d, p)H^3$, 2702
Cook, C. J. and Barrett, W. A. A regulator for a 20 to 250 kilovolt Cockcroft–Walton accelerator, 8454
Cook, C. S. *See also* Chang, C. H., 4835
Cook, C. S. and Porter, F. T. The $Zn^{64}(d, \alpha n)Cu^{61}$ reaction, 5064
Cook, D. The carbon-dioxide–nitrous-oxide system in the critical region, 6715
Cook, D. and Rowlinson, J. S. Deviations from the principle of corresponding states, 7646
Cook, D. B. and Danby, C. J. A simple diaphragm micromanometer, 7505
Cook, J. C. An analysis of airborne surveying for surface radioactivity, 3759
Cook, L. G. and Shafer, K. D. The neutron activation of Ca^{46}, 6232
Cook, W. R., Jr and Jaffe, H. Ferroelectricity in oxides of fluorite structure, 1611. Ferroelectricity in oxides of face-centered cubic structure, 4078
Cooke, A. H. and Drain, L. E. Proton magnetic resonance and molecular motion in solids, 1827
Cooke, A. H., Duffus, H. J. and Wolf, W. P. Cerium magnesium nitrate. I. The magnetic properties and specific heat above 1°K, 7630
Cooke, J. A. *See* Haslam, R. N. H., 7925
Coomes, E. A. *See* Brock, E. G., 2517; Juenker, D. W., 6120
Coon, J. H., Graves, E. R. and Barschall, H. H. Total cross sections for 14-MeV neutrons, 1137
Coonan, L. *See* Ingram, M., 2868
Cooper, C. B. Precision measurements of the enthalpy of KBr and KI at high temperatures, 6734
Cooper, C. D. Spectra of *p*-fluorobenzonitrile in the near ultraviolet, 4010. *See also* Knipe, R. H., 4012
Cooper, C. D. and Noegel, F. W. The near ultraviolet absorption spectra of 1, 4 bis-(trifluoromethyl) benzene and 1,3,5 tris-(trifluoromethyl) benzene, 1534
Cooper, F. S., Delattre, P. C., Liberman, A. M., Borst, J. M. and Gerstman, L. J. Some experiments on the perception of synthetic speech sounds, 713*
Cooper, H. G. *See* Marx, J. W., 216
Cooper, P. N., Crocker, V. S. and Walker, J. The relative stopping power of hydrogen and of helium for slow α-particles, 8459. Range-energy data from the $^{10}B(n, \alpha)^7Li$ and $^6Li(n, t)^4He$ reactions, 8460
Cooper, R. *See* Calderwood, J. H., 1620, 3342, 6759
Coor, T. *See* Hafner, E. M., 1923
Cope, W. F. The measurement of skin friction in a turbulent boundary layer at a Mach number of 2·5, including the effect of a shock-wave, 1432
Copeland, C. S., Silverman, J. and Benson, S. W. The system $NaCl–H_2O$ at supercritical temperatures and pressures, 1998

Copeland, K., Downing, A. C. and Hill, A. V. A moving coil galvanometer of extreme sensitivity, 3295

Copley, A. L. The rheology of blood. A survey, 4430

Coppens, R. On the radioactivity of ampelites, 4976

Coppola, P. P. *See* Hughes, R. C., 295–6

Copson, E. T. On sound waves of finite amplitude, 3941

Corbeiller, P. Le. *See* Le Corbeiller, P.

Corbella, J. M. *See* Stephenson, C. C., 6003

Corben, H. C. The current density in quantum electrodynamics, 608, 7433. A unified field theory with varying charge and rest-mass, 2171. A reformulation of field theory, 7440

Corbridge, D. E. C. and Lowe, E. J. Structure of white phosphorus: single crystal X-ray examination, 1258

Corey, H. E. *See* Vogel, F. L., 5774

Corey, R. B. and Pauling, L. Molecular models of amino acids, peptides, and proteins, 8630

Corinaldesi, E. and Trainor, L. Evaluation of integrals in the theory of atomic scattering of electrons, 7462

Corinaldesi, E., Trainor, L. and Wu, T.-Y. The Oppenheimer approximation for the scattering of electrons, 4140

Cork, B. The elastic scattering of protons from helium 4, 1692. Proton-proton scattering at 32·0 MeV, 6098. *See also* Benveniste, J., 2689

Cork, J. M. *See also* Jordan, W. C., 6199

Cork, J. M., Brice, M. K., Nester, W. H., LeBlanc, J. M. and Martin, D. W. The radioactive decay of tungsten 187, 4304. The radioactive decay of Cs^{134}, Os^{185}, Os^{191}, and Os^{193}, 4995. Nuclear levels associated with zirconium 95 and niobium 95, 5000

Cork, J. M., LeBlanc, J. M., Nester, W. H. and Brice, M. K. Nuclear levels in Cs^{131}, 7079

Cork, J. M., LeBlanc, J. M., Nester, W. H. and Stumpf, F. B. Energy levels associated with the radioactive decay of Gd^{153} and Tb^{161}, 1054

Corkan, R. H. and Doodson, A. T. Free tidal oscillations in a rotating square sea, 1353

Corliss, C. H., Bozman, W. R. and Westfall, F. O. Electrodeless metal-halide lamps, 4753

Corliss, L. *See* Weiss, R. J., 1269

Corliss, L. M. *See also* Hastings, J. M., 8526

Corliss, L. M., Hastings, J. M. and Brockman, F. G. A neutron diffraction study of magnesium ferrite, 6134

Cormack, A. M. Momentum determinations from cloud-chamber photographs in axially symmetrical magnetic fields, 4170

Cormack, D. V. *See* Johns, H. E., 7112

Corney, G. M. Relation of film characteristics to X- and gamma-ray monitoring, 2643

Cornish, F. H. J. and MacDonald, D. K. C. The influence of lattice vibration spectrum on electronic thermal conductivity, 1571

Cornish, F. H. J. and Olsen, J. L. A calculation of the thermal conductivity of superconductors in the intermediate state, 7687

Cornsweet, J. C. *See* Riggs, L. A., 6338

Cornsweet, T. N. *See* Riggs, L. A., 6338

Corona, O. C. Quantitative chemical analysis of the components of a mixture by the X-ray diffraction method, 5188

Corre, Y. Le. *See* Le Corre, Y.

Corrsin, L., Fax, B. J. and Lord, R. C. The vibrational spectra of pyridine and pydridine-d_5, 6621

Corson, D. R. Radiation by electrons in large orbits, 6091

Corte, M. Della. *See* Della Corte, M.

Cortellessa, G. An apparatus for filling neutron counters with boron trifluoride, 3379. *See also* Ageno, M., 2719, 3171, 3601, 8470, 8686

Cortini, G. *See also* Baroni, G., 8485

Cortini, G., Manfredini, A. and Segré, G. On nuclear explosions produced by primary protons in emulsions exposed in the high atmosphere, 7780

Corum, C. *See* Garrison, W. M., 7119

Corval, M., Chapiro, A. and Cousin, C. Chemical dosimetry of gamma rays in the presence of slow neutrons, 2025

Corwin, R. W. *See* Lanter, R. J., 287

Cosslett, V. E. Intensity limitations in a point source of X-rays, 259. Practical electron microscopy, 2489

Cosslett, V. E. [Conf. rep.]. Electron microscopy of solid surfaces, 1185

Cosslett, V. E. and Nixon, W. C. X-ray sha microscopy, 2130. The X-ray shadow microsc 5509

Cosslett, V. E., Nutting, J. and Reed, R. [Conf. r Summarized proceedings of a conference on elec microscopy—Bristol, September, 1952, 3351

Costa de Beauregard, O. *See* de Beauregard Costa

Coté, R. E. *See also* Ochs, S. A., 3490

Coté, R. E. and Kusch, P. Low frequency resona in the spectra of diatomic molecules, 4257

Cotton, P. *See* Brin, A., 6520

Cottrell, A. H. Theory of dislocations, 3648. D cations and plastic flow in crystals, 7275. A no the Portevin–Le Chatelier effect, 7992. *See* Ardley, G. W., 7993

Cottrell, A. H., Hunter, S. C. and Nabarro, F. Electrical interaction of a dislocation and a s atom, 8612

Couchet, G. Secondary emission from metals u bombardment with positive ions of lithium, On the preparation of some solid ion sources i induction furnace and the solar furnace, 5547. the reflection coefficient of positive lithium striking a metallic surface and the energy spec of the secondary electrons, 6870. *See also* B sier, J., 6911

Couder, A. The use of heat deformation to y parabolic surface, 172. The micrometeorol conditions of telescopic observation; an attem ameliorate them, 5269

Couderc, P. *See* Becquerel, J., 5271, 5272

Coulbert, C. D. Mach–Zehnder interferometer cations as used in the study of convection and duction heat-transfer systems, 7620

Coulomb, J. The nature of *T*-waves generate submarine seisms, 1270. Refraction of seismic travelling on the sea bed. Application to t waves, 5789

Coulon, R., Oksengorn, B. and Robin, S. Inf absorption of the frequency ν_2 of compresse gas, 7574

Coulon, R., Oksengorn, B., Robin, S. and Vod Infrared absorption of N_2 and O_2 induced by molecular forces, 5386. Infrared absorption and O_2 induced by intermolecular forces, Perturbation of the fundamental infrared ba hydrogen chloride by nitrogen and argon, pressed up to 1000 atm., 6637

Coulson, C. A. Alkyl shifts in absorption spec azulene and other aromatic molecules, 1829 *also* Duncanson, W. E., 345; Taylor, R., 34

Coulson, C. A. and Altmann, S. L. Compres energy and resonance energy, 4953

Coulson, C. A., MacColl, A. and Sutton, L. E polarizability of molecules in strong electric 4955

Coulson, C. A. and Taylor, R. Studies in graph related compounds. I. Electronic band str in graphite, 344

Courant, E. D., Livingston, M. S. and Snyder The strong-focusing synchrotron—a new high accelerator, 907

Courant, E. D., Livingston, M. S., Snyder, H. Blewett, J. P. Origin of the "strong-foc principle, 7729

Courant, H. *See* Annis, M., 8483

Courtemanche, R. *See* Demers, P., 3415

Courtney-Pratt, J. S. Image converter tubes an application to high speed photography, 2886

Courtoy, C. Infrared spectrum of CD_3Br und dispersion (2900 to 3400 cm^{-1}), 3139

Cousin, C. *See* Corval, M., 2025

Couture-Mathieu, L., Ketelaar, J. A. A., Vedd and Fahrenfort, J. Directional variati frequency in the infrared spectrum of crysta Frequency changes with orientation in the red spectrum of crystals, 4710

Couture-Mathieu, L. and Mathieu, J.-P. Sc spectrum of piezoelectric crystals. IV. Blend New measurements on the anomalies of pola in the Raman spectrum of calcite, 6662

Cova, D. R. and Drickamer, H. G. The e pressure on diffusion in liquid sulfur, 7497

Cowan, C. L., Jr. *See also* Reines, F., 5112

OWAN, C. L., JR, REINES, F., HARRISON, F. B., ANDERSON, E. C. and HAYES, F. N. Large liquid scintillation detectors, 6108
OWAN, G. R. *See also* NIGHTINGALE, R. E., 8733; WHITE, H. F., 7579
OWAN, G. R., ROTENBERG, D., DOWNIE, A., CRAWFORD, B., JR and OGG, R. A., JR. Some new data on the NO–N_2O_5 reaction, 8732
OWAN, G. R., VINCENT, E. and CRAWFORD, B., JR. Application of a fast-scanning infrared spectrometer to gas-phase kinetic studies, 8731
OWLEY, J. M. Electron diffraction study of the hydrogen bonds in boric acid, 4488. Stacking faults in γ-alumina, 8117. Structure analysis of single crystals by electron diffraction. I. Techniques, 8118; II. Disordered boric acid structure, 8119
OWLEY, J. M. and REES, A. L. G. Design of high-resolution electron diffraction camera, 3753
OWLING, T. G. *See* CHAPMAN, S., 7512
OX, B. G. *See* MCDOWELL, C. A., 350
OX, C. D. *See* JOHNS, M. W., 397, 2491
OX, F. H. *See* VAN DEN DUNGEN, F. H., 7410
OX, J. A. M. On the theory of angular correlation of two successive gamma quanta emitted by orientated nuclei, 5031. *See also* TOLHOEK, H. A., 7100
OX, J. F. *See* VAN DEN DUNGEN, F. H., 1285, 5225
OX, J. T. *See* WILLIAMS, Q., 367
OX, R. T. Brownian motion in the theory of irreversible processes, 2210
OYLE, R. A., HALE, K. F. and WAINWRIGHT, C. The design and operation of a precision Geiger-Müller counter X-ray diffraction spectrometer, 5207
RAGG, L. H. *See* SHARMAN, L. J., 5874
RAGGS, J. D. *See* CRAIG, R. D., 6818; WARREN, J. W., 4176
RAIG, D. P. and HOBBINS, P. C. Polarized ultra-violet absorption of anthracene, 4711
RAIG, D. P. and LYONS, L. E. On the assignment of the naphthalene bands at 3200–2900 Å, 127
RAIG, D. S., DONAHUE, D. J. and JONES, K. W. Electrostatic analysis of nuclear reaction energies. II, 1111
RAIG, H. and DIETRICH, C. F. Development of a new method for the absolute determination of β-ray energies, 3353
RAIG, R., BARTEL, A. and KIRK, P. L. A photometer and absorption cell attachment for ultramicrospectrophotometry, 2321
RAIG, R. D. The behaviour of luminous electrode spots formed during spark discharges, 4821
RAIG, R. D. and CRAGGS, J. D. Some properties of hydrogen spark channels, 6818
RAIN, C. M. Directly recorded tropospheric refractive index fluctuations and profiles, 2856
RAIN, C. M., DEAM, A. P. and GERHARDT, J. R. Measurement of tropospheric index-of-refraction fluctuations and profiles, 5257
RANDALL, W. E. *See* SCHECTER, L., 5065
RANE, H. R. and MCDANIEL, E. W. An automatic counter for age determination by the C^{14} method, 926
RANE, W. W. T. *See* BATZEL, R. E., 7923
RANNA, N. G. *See* PETCH, H. E., 1845, 6948
RARY, A. P. Stratosphere winds and temperatures in low latitudes from acoustical propagation studies, 5258
RASEMANN, B. A trochoidal analyzer for charged particles, 6838. Decay of Ga^{64} and Ga^{65}, 7073
RASEMANN, B. and EASTERDAY, H. T. The decay of Cr^{49}, 7075
RAVEN, J. H. *See* HAWKINGS, R. C., 3539
RAWFORD, B., JR. Symmetry factoring of the kinetic and potential energy matrices, 6163. *See also* COWAN, G. R., 8731–2; NIGHTINGALE, R. E., 8733; WHITE, H. F., 7579
RAWFORD, B. L., JR, LANCASTER, J. E. and INSKEEP, R. G. The potential function of ethylene, 4249
RAWFORD, M. F. *See* CHISHOLM, D. A., 754; WELSH, H. L., 6660
REEDON, J. E. *See* UDELSON, B. J., 253
RESPIN, D. The abundance of deuterium in the solar atmosphere, 4564
RESTI, M., LORIA, A. and ZAGO, G. Wilson chamber in magnetic field, 8474. On the zenithal distribution of particles of extensive showers, 8494
CREWE, A. V. and EVANS, W. H. The diffusion cloud chamber, 286
CRIBIER, D. Determination of the oscillations of thermal agitation of the atoms engaged in a crystal: case of the fluorine-type structure, 8054
CRICK, F. H. C. The unit cells of four proteins, 3751. The strength of the 10 Å reflexions in haemoglobin, 8086. The Fourier transform of a coiled-coil, 8785. The packing of α-helices: simple coiled-coils, 8786
CRITTENDEN, E. C., JR. *See also* HOFFMAN, R. W., 3724
CRITTENDEN, E. C., JR and HOFFMAN, R. W. Thin films of ferromagnetic materials, 8544
CROCKER, B. E. *See* WELLS, R. J., 5366
CROCKER, V. S. *See* COOPER, P. N., 8459–60
CROFT, A. J. A big expansion helium liquefier, 1584. A laboratory plant for making liquid air from liquid oxygen, 3262
CROFT, A. J., FAULKNER, E. A., HATTON, J. and SEYMOUR, E. F. W. The electrical resistivity of gold at very low temperatures, 4105
CROMPTON, R. W., HUXLEY, L. G. H. and SUTTON, D. J. Experimental studies of the motions of slow electrons in air with application to the ionosphere, 6901
CROMPTON, R. W. and SUTTON, D. J. Experimental investigation of the diffusion of slow electrons in nitrogen and hydrogen, 2508
CRONEMEYER, D. C. *See* RANK, D. H., 4007
CROOK, A. W. Work-hardening of annealed mild steel under static and dynamic conditions, 1990
CROSBIE, E. A. Relative energy levels of some *P* shell nuclei in intermediate coupling, 4272
CROSBY, E. H. *See* HASLAM, R. N. H., 2706, 7925
CROSLAND-TAYLOR, P. J. A device for counting small particles suspended in a fluid through a tube, 1402
CROSS, L. E. The dielectric properties of barium titanate single crystals in the region of their upper transition temperature, 8392
CROSS, P. C. *See* ALLEN, H. C., JR, 1012; BAIR, E. J., 5765, 7551; INNES, K. K., 3496
CROSSWHITE, H. M. *See* STEINHAUS, D. W., 3975
CROUCH, M. F. and HAYNAM, G. E. Counting rate measurement by interval sampling, 3381
CROWE, R. W. *See* BRAGG, J. K., 828; SHARBAUGH, A. H., 6825
CROWELL, C. R. *See* REDHEAD, P. A., 3366
CROZET, A., FIGUET, J. and JANIN, J. Study of some optical properties of CaO (Pb, Sm) and CaO (Pb, Pr), 7589
CRUICKSHANK, D. W. J. and ROBERTSON, A. P. The comparison of theoretical and experimental determinations of molecular structures, with applications to naphthalene and anthracene, 8791
CRUICKSHANK, D. W. J. and ROLLETT, J. S. Electron-density errors at special positions, 8792
CRUSE, K. *See* ELLENDT, G., 6283
CRUSSARD, J., LEPRINCE-RINGUET, L., MORELLET, D., ORKIN-LECOURTOIS, A. and TREMBLEY, J. Slow κ mesons emitted in "cosmic [ray] stars," 5560. *K* mesons, 7173
CRUSSARD, J. and MORELLET, D. Probable emission of a nuclear fragment containing a V^0 particle, 3616
CUBERO, M. *See* BRU, L., 1825
CUDDEBACK, R. B. and DRICKAMER, H. G. The effect of pressure on diffusion in aqueous and alcoholic salt solutions, 3924
CUDDEBACK, R. B., KOELLER, R. C. and DRICKAMER, H. G. The effect of pressure on diffusion in water and in sulfate solutions, 3923
CÜER, P. and JUNG, J. J. The angular distribution of Be^9 (d, t) Be^8 at low energy, 4354. Evidence for the excited state of He^5 in the reaction Li (d, α) He^5, 5062. On the experimental study and the mechanism of the reaction B^{10} (d, α) 2α, 7921
CÜER, P. and LONCHAMP, J. On the thickness of tracks due to heavy nuclei in nuclear emulsions, 2881
CÜER, P. and MAGNAC-VALETTE, D. Some reactions induced in light nuclei by tritons, 7924
CUGIANI, M. *See* ALBERTONI, S., 7428
CULLEN, A. L. A microwave vibration wattmeter, 2560
CULLITY, B. D. and JULIEN, C. A. The effect of a Soller slit on the diffraction of X-rays by deformed crystals, 5780
CULLWICK, E. G. Electromagnetic momentum and Newton's third law, 975
CULPEPPER, S. V. *See* SELIGER, H. H., 4986

Cumming, C. and Welsh, H. L. The ν_3 Raman band of ammonia, 6664
Cuninghame, W. A. F. *See* Bruce, C. F., 2976
Cunliffe, A. *See also* Palmer, L. S., 1607
Cunliffe, A. and Gould, R. N. On inverse perturbation, 8241
Cunningham, B. B. *See* Fleming, E. H., Jr, 1059
Cunningham, W. J. A limitation of the reversion method, 6377
Cunninghame, J. G. The chain ^{79}As–^{70m}Se in slow neutron fission of ^{235}U, 7938
Cupp, C. R. Gases in metals, 3636
Curcio, J. A. *See also* Stewart, H. S., 1291
Curcio, J. A., Drummeter, L. F., Petty, C. C., Stewart, H. S. and Butler, C. P. An experimental study of atmospheric transmission, 2851
Curie, D. Capture and recapture of electrons in phosphorescence, 2364. On a simple picture of the phenomena of nuclear fission, 2725. The mechanism of phosphorescence in crystal phosphors, 4726. On the mechanism of electroluminescence, 5413. The breadth of spectral lines and hyperfine structure in X-ray spectra, 5500
Curie, I. Detection and estimation of carbon in steel by the use of artificial radioactivity, 1234
Curle, N. The mechanics of edge-tones, 3938
Curran, S. C. Measurement of beta particles of low energy and allied phenomena, 5027. *See also* Valentine, J. M., 933
Currie, B. W. *See* Forsyth, P. A., 4231
Currie, M. R. The utilization of degenerate modes in a spherical cavity, 8587
Curry, C. Models illustrating optical coma and astigmatism, 7544
Curtis, C. D. Bremsstrahlung cross section of 60-MeV electrons in lead, 1671
Curtis, C. W. *See* Emrich, R. J., 3042
Curtis, H. W. Measuring the mean power of varying-amplitude complex audio waves, 695
Curtis, K. K. and Hadley, L. N. Acoustical interference filters, 694
Curtiss, C. F. The separation of the rotational coordinates from the *N*-particle Schroedinger equation. II, 7822
Cusano, D. A. *See* Studer, E. J., 5977
Custers, J. F. H. Unusual phosphorescence of a diamond, 2373
Cuthbertson, D. Remark on the spectrum of He_2 in the near infrared, 6635
Cutolo, M. Experimental determination of resonance curves in the motion of slow electrons of the upper atmosphere, 1789
Cwilong, B. M. The solidification curve of helium II, 189
Cwilong, B. M., Lees, J. F. and Manchester, F. D. Cavitation effect in helium II, 190
Czepa, O. On the conduction of energy by long wave radiation in the air layer near the ground, 5802
Czyzak, S. J. On the theory of dipole interactions with metals, 518. *See also* Wessel, W., 7648

Daams, H. The apparent dead time of a Geiger counter, measuring an intensity of radiation which varies periodically, 3373
Dacey, G. C. Space-charge limited hole current in germanium, 6047
Dadayan, A. Nuclear interaction of protons of high energy, 5700. *See also* Alikhanyan, A., 5551
Dahlquist, C. A. and Hatfield, M. R. Constant stress elongation of soft polymers: time and temperature studies, 4429
Dailey, B. P. *See* Mays, J. M., 742
Daion, M. I. Generation of protons and π-mesons by cosmic neutrons, 7779
Daitch, P. B. and French, J. B. The Born approximation theory of (d, p) and (d, n) reactions, 441
Dalgarno, A. Three-body scattering problems, 6478. *See also* Bates, D. R., 1904; Bransden, B. H., 25, 3359
Dalgarno, A. and Yadav, H. N. Electron capture. II. Resonance capture from hydrogen atoms by slow protons, 3578

On the analysis of τ-meson data and the nature the τ-meson, 8702
Dalitz, V. C. and Schuchmann, J. A. A double-replic method using carbon layers, 5732
Dallaporta, N. On the lifetime of the μ^+- and μ^- mesons, 4382. *See also* Bonetti, A., 8506; Ceccarelli, M., 1145, 2734
Daly, E. F. Optical design of double-beam spectrometers, 3978
Dambara, T. Photoelectric transit instrument, 3796
Damm, C. C. The secondaries of penetrating showers 2526. *See also* Smith, L. G., 5666
Damon, P. E. and Edwards, R. R. Electromagneti spectrum of radium D, 4326
Damon, R. W. Relaxation effects in the ferromagneti resonance, 8538
Danby, C. J. *See* Cook, D. B., 7505
Danckwerts, P. V. The definition and measurement o some characteristics of mixtures, 2249
Danforth, W. E. *See* Weinreich, O. A., 763
Daniel, V. and Turner, C. Dielectric observations o nucleation, 1616
Daniels, F., Boyd, C. A. and Saunders, D. F. Thermoluminescence as a research tool, 5415
Daniels, F. B. The mechanism of generation of infrasound by the ocean waves, 6561
Daniels, J. M. High power solenoids; stresses an stability, 3442. The effect of interactions in a paramagnetic on the entropy and susceptibility, 6931 *See also* Bishop, G. R., 1896
Daniels, J. M., Grace, M. A., Halban, H., Kurti, N and Robinson, F. N. H. The alignment of cobalt 58 1841
Daniels, J. M. and Robinson, F. N. H. Cerium magnesium nitrate. II. Determination of the entropy absolute temperature relation below 1°K, 7631
Danilov, V. I. *See* Danilova, A. I., 2757
Danilova, A. I., Danilov, V. I. and Spektor, E. Z The structure of liquid tin, bismuth and lead, 2757
Danusso, F. Ultrasonic velocity and adiabatic compressibility of hydrocarbon mixtures, 4663
Danusso, F. and Fadigati, E. Ultrasonic velocity an adiabatic thermodynamic property of liquid organi compounds, 4665
Danysz, M. *See also* Pniewski, J., 5686
Danysz, M. and Pniewski, J. Delayed disintegration o a heavy nuclear fragment. I, 5716
Darbyshire, J. The generation of waves by win 2235
Darbyshire, J. and Tucker, M. J. A photomechanica wave analyser for Fourier analysis of transient waveforms, 8177
Dardel, G. v. *See* v. Dardel, G.
Darden, S. *See* Nereson, N., 2724
Darden, S. E. *See* Miller, D. W., 456
Dargent, R. *See* Fert, C., 3639
Darlington, L. E., Haugsnes, J., Mann, H. M. an Roberts, J. H. The angular distribution o $Li^6(n, \alpha)H^3$ for neutrons of 200, 270, 400, an 600 keV, 6231
Darmois, E. and Marais, A. On the triboelectric properties of polyvinyl chloride, 6747
Darnell, A. J. *See* Farber, M., 2779
Darrow, K. K. Magnetic resonance. I. Nuclear magnetic resonance. II. Magnetic resonance of electrons, 4287
Darwent, B. deB. The reaction of $Hg(^3P_1)$ wit ethylene, 1210. The mercury photosensitized oxidation of paraffins, 2021. *See also* Agius, P., 1211
Darwent, B. deB. and Hurtubise, F. G. The quenchin of mercury resonance radiation. II. The production of metastable $(^3P_0)$ atoms, 733
Darwent, B. deB. and Roberts, R. The photochemica and thermal decompositions of hydrogen sulphide 4447
Darwin, C. Note on hydrodynamics, 4637
Das, A. K. and Ramanathan, A. S. Distribution o radiation flux across a sunspot, 6424
Das Gupta, D. R. *See* Chaudhuri, K. D., 2783
Das Gupta, M. K. *See* Brown, R. H., 1337
Das Gupta, S. C. Note on Love waves in a homogenou crust laid upon heterogenous medium, 2090
Dascola, G. *See* Bonetti, A., 8506

, J. G. and Sommers, H. S., Jr. A high transmission slow neutron velocity selector, 3623
ate, M. *See* Okamura, T., 2547, 4079
ätwyler, G. New applications of hot-wire anemometry, 1436
aubach, E. Discussion of the adsorption isotherms, measured by Kautsky, Gaubatz and Grieff, of gases on siloxene and bromsiloxene. I, 5178
aube, Ya. Ya. *See* Dyakov, V. A., 2118
Aubry de Puymorin, R. Artificial synthesis of the neutron and its future, 7182
audel, R. The role of the de Broglie wave in the study of molecular structures, 996. Comment on the role of indistinguishability of electrons in theoretical chemistry, 997. Relation between the radioactive properties of nuclei and the chemical structure of the molecules which enclose them, 1863. The geometrical classification of chemical bonds. Geometrical definition of chemical functions, 2034. On the meaning of the notion of a shell. Theoretical basis of the quasi-atomic model of the nucleus, 2608. On the nature of the exchange energy: definition of the most localized orbitals, 5624. Geometrical classification of bonds and of chemical groups. Influence of the environment on the properties of bonds, 5762. *See also* Chalvet, O., 998
audel, R. and Vroelant, C. Relation between the new theory of directed valence and the geometrical notation of surroundings, 3700
audin, A. and Daudin, J. Auger showers in the atmosphere, 5556. Auger showers and the density of the upper atmosphere, 6915
audin, J. The varytrons and the new mass measurements, 7951. *See also* Daudin, A., 5556, 6915; Rochet, G., 1724
aunt, J. G. *See also* Heer, C. V., 8377; Horowitz, M., 815; Nicol, J., 2423; Smith, T. S., 864, 3315
aunt, J. G. and Smith, T. S. Superconductivity of rhenium, 240
auphinee, T. M. An isolating potential comparator, 4783
auvillier, A. Observation of the atmospheric field at Khartoum during the total eclipse of the sun on 25th February, 1952, 1292. The cosmogony of the solar system, 1338
avenport, P. A., Jeffries, T. O., Owen, M. E., Price, F. V. and Roaf, D. The D-D cross-section and angular distribution between 55 and 430 KeV, 3588
avid, E. Isotope separation with continuously operating separation tubes, 6189
avid, H. G., Hamann, S. D. and Prince, R. G. H. The third virial coefficient of ethane, 1438
avid, J.-P. *See* Perrot, M., 6764
avidson, C. R. *See* Andrew, A., 3320
avidson, E. H. *See* Weatherly, T. L., 4951
avidson, H. R. and Friede, E. The size of acceptable color differences, 6683
avidson, J. P. and Feenberg, E. Derivations from *LS* coupling in the spheroidal core nuclear model, 2620
avidson, N. *See* Marshall, R., 5613
avidson, P. M. A similarity theorem in electrical contacts, 868. Photo-ionization and the electrical breakdown of gases. Mathematical appendix, 6063. Formative time lags in the electrical breakdown of gases. Mathematical appendix, 6812
avies, A. J. *See* Button, J. C. E., 8754
avies, D. M. Hysteresis in rubber, 1986
avies, J. G. A simple electrical method of recording small volume changes, 8248
avies, L. W. Spectroscopic study of calcium discharges in a magnetic field, 3097
avies, M. G. and Kronberger, H. A full radiation pyrometer suitable for temperature measurements in the range 0° to 100°c, 4768
vies, R. D. *See* Piddington, J. H., 5279
vies, R. O. *See also* Barker, J. R., 3846
vies, R. O. and Jones, G. O. The irreversible approach to equilibrium in glasses, 4401. Thermodynamic and kinetic properties of glasses, 8710
vies, T. H. *See* Wexler, S., 1223, 1891
vies, T. V. The forced flow of a rotating viscous liquid which is heated from below, 7485
vila-Aponte, J. *See* del Rosario, L., 942
vin, M. On stability and the intrinsic curve, 1978

Davis, B. I. *See* Marx, J. W., 795
Davis, D. M., Hart, J. C. and Morgan, K. Z. Aerial surveying for radioactive ground contamination, 2642
Davis, D. O. and Meissner, K. W. The fine structure of the $(^4S^0)3p^3P$ term of oxygen O I, 5948
Davis, G. *See* Tidman, D. A., 5717
Davis, K. E. Angular dependence of inelastic scattering of protons on Be^9, 1691
Davis, K. E., Marion, J. B., Delord, J. F. and King, K. M. The close pair effect in cosmic-ray stars, 310
Davis, K. H., Biddulph, R. and Balashek, S. Automatic recognition of spoken digits, 1473
Davis, L. R. *See* Perlow, G. J., 303
Davis, R., Gibson, K. S. and Haupt, G. W. Spectral energy distribution of the International Commission on Illumination light sources *A*, *B*, and *C*, 3197
Davis, R. H. *See* Graves, J. D., 2370
Davis, R. W. *See* Phillips, D. D., 1133
Davis, T. W. *See* McNesby, J. R., 7264
Davis, W., Jr. *See also* Rosen, F. D., 6208
Davis, W., Jr, Conley, L. L. and Rutledge, G. P. Apparatus for rapid determination of liquid-liquid and liquid-solid equilibria involving corrosive materials, 6279
Davison, P. W. *See* Greenblatt, M. H., 930
Davison, S., Goldblith, S. A., Proctor, B. E., Karel, M., Kan, B. and Bates, C. J. Dosimetry of a kilocurie cobalt-60 source, 8649
Davisson, C. J. and Beams, J. W. A new variation of the rotation-by-magnetization method of measuring gyromagnetic ratios, 8577
Davisson, J. W. *See* Burstein, E., 2462
Davoine, F. *See* Bernard, R., 5135
Davy, E. The intensity-time relation for multiple flashes of light in the peripheral retina, 2112
Davy, N. *See also* Peake, H. J., 6935
Davy, N. and Langton, N. H. The external magnetic field of a single thick semi-infinite parallel plate terminated by a convex semi-circular cylinder, 7789
Dawson, B. The structure of the 9(18)-heteropoly anion in potassium 9(18)-tungstophosphate, $K_6(P_2W_{18}O_{62}).14H_2O$, 2830
Dawson, G. H., Grant, D. E. and Ott, H. F. A precision color temperature meter for tungsten illumination, 723
Dawson, I. M. Techniques for the electron microscopy of crystals, 7205. *See also* Anderson, N. G., 7282
Dawson, J. K. Electronic structure of the heaviest elements, 1035. Magnetochemistry of the heaviest elements. VII. Sodium plutonyl acetate, 3437
Dawson, T. L. *See* Bair, E. J., 7551
Dawson, W. K. and Bigham, C. B. Some reactions produced in Ilford emulsions, 2716
Day, A. E. *See* Yaffe, L., 5088
Day, A. G. A vacuum microbalance for measuring sorption in dielectrics, 6501
Day, F. H. X-ray calibration of radiation survey meters, pocket chambers and dosimeters, 2640
Day, G. A. Radar observations of rain at Sydney, New South Wales, 6330
Day, H. R. Irradiation-induced photoconductivity in magnesium oxide, 7682
Day, M. K. B. and Hill, V. J. Thermal transformations of the aluminas and their hydrates, 1261
Day, R. B. *See* Huus, T., 7898
Dayal, B. and Appalanarasimham, N. The evaluation of the elastic constants of rutile from spectroscopic data, 8721
Dayhoff, E. S. *See also* Triebwasser, S., 1847
Dayhoff, E. S., Triebwasser, S. and Lamb, W. E., Jr. Fine structure of the hydrogen atom. VI, 1848
Dayton, B. and Willard, D. The decay of a neutral V particle into two mesons, 7177
Dayton, I. E. *Z*-hyphen dependence of the pair production cross section at 1·33 and 2·62 MeV, 2680
Dazia, T. *See* Takemoto, S., 8683
Deacon, E. L. Climatic change in Australia since 1880, 6331
Deal, W. E. *See* Shreffler, R. G., 2749
Deam, A. P. *See* Crain, C. M., 5257
Deb, A. R. On the ultraviolet absorption spectra of organic substances in the liquid and solid states. III. Ethylbenzene and isopropylbenzene, 3126

Blakemore, J. S., 8413

de Beauregard, O. Costa. The reality problem in quantum mechanics, 601. Relation between the principle of retarded potentials and the second principle of thermodynamics, 1599. On the quantum and classical problem of irreversibility, 2936. Connection between the principle of retarded potentials and the second principle of thermodynamics, 4780. A reply to the argument directed by Einstein, Podolsky and Rosen against Bohr's interpretation of quantum phenomena, 6451. On the introduction of de Broglie's theory of the photon in Schwinger's quantum electrodyamics, 7434

DeBenedetti, S. *See* Leipuner, L., 7115

de Boer, J. A discussion on theory of liquids: Theories of the liquid state, 2238

de Boer, J. and Gorter, C. J. Thermodynamics of the transition between helium I and helium II in mixtures of ^{3}He and ^{4}He, 2411

de Boer, J., van der Maesen, F., and ten Seldam, C. A. The molecular polarisation of compressed non-polar gases, 6549

de Boer, J. H. The dynamical character of adsorption, 2031

de Borde, A. H. *See* Burbidge, G. R., 1945

de Broglie, L. On the introduction of the ideas of pilot-wave and double solution in the theory of the Dirac electron, 43. On the interpretation of the wave mechanics of systems of particles in configuration space, according to the double solution theory, 1396. The wave mechanics of systems of similar particles and the double solution theory, 1397. On the interpretation of wave mechanics using waves with singular regions, 6483

de Brouckère, L. *See* Prigogine, I., 2247

Debure, M. and Leroy, N. The primary standard of luminous intensity and the photometric scale at the Conservatoire National des Arts et Métiers, 3963

de Bye, J. A. W. van der Does. *See* van der Does de Bye, J. A. W.

Debye, P. *See* Bueche, F., 1965

Debye, P. P. and Conwell, E. M. Mobility of electrons in germanium, 221

de Carvalho, H. G. and Yagoda, H. The range of alpha-particles in water, 402

Decius, J. C. Classical limit of mean thermal vibration amplitudes, 7001. *See also* Teranishi, R., 6626

de Cizancourt, H. On a way of calculating isostatic anomalies, 5787

Decker, C. E. *See also* McGee, P. R., 2591; Ziomek, J. S., 2340

Decker, C. E., Cleveland, F. F. and Bernstein, R. B. Substituted methanes. XIII. Infrared spectral data and assignments for dibromodifluoromethane, 3120

Dedecker, P. Influence of Coriolis force on atmospheric motion, 5240

de Donder, T. The role of solid connections in general relativity, 20. To every [form of] wave mechanics there corresponds a [form of] statistical mechanics, 6489

Defay, R. *See* Dufour, L., 5243

Degenhart, V. *See* Schüler, H., 3334, 6823

De Graaff, W. *See* Michels, A., 6712

De Greve, L. *See* Van Itterbeek, A., 1184, 7685

de Groot, S. R. Thermodynamics of irreversible processes, 4067. Interference terms and symmetry principles in the theory of beta decay with mixed invariants, 4313. On the theories of angular distribution and correlation of beta and gamma radiation, 4314. *See also* ten Seldam, C. A., 2255–7; Tolhoek, H. A., 3279

de Groot, S. R., Mazur, P. and Overbeek, J. T. G. Nonequilibrium thermodynamics of the sedimentation potential and electrophoresis, 1651

de Groot, S. R., Mazur, P. and Tolhoek, H. A. Thermodynamics of irreversible electrochemical phenomena, 8386

de Haan, E. F. *See* van Wijngaarden, J. G., 4175

de Haas, N. *See* Elder, F. K., Jr, 62

Dehalu, M. An electro-mechanical system [of units] with MLT dimensions, 3845

de Hemptinne, M. *See* Charette, J., 4708

Dehlinger, M. Entropy of electrons in metallic lattices, 3477

metal chlorides and oxychlorides, [illegible] quadrupole spectra in two boron trialkyls, 494 Addendum to "Nuclear quadrupole spectra in tw boron trialkyls, 7005. Nuclear quadrupole reso ance in rhombic sulfur and the quadrupole momen of S^{33} and S^{35}, 7042. *See also* Robinson, H. G., 49

Deĭgen, M. F. On the correlation between absorptic band maxima of colour centres and lattice par meters in alkali halides, 3721

Déjardin, G., Janin, J. and Peyron, M. Analysis some vibration-rotation bands of the molecule OH 121

de Jong, D., Endt, P. M. and Simons, L. J. G. Angul dependence and yield of the $Be^9(d, p)$ Be^{10} ar $Be^9(d, t)Be^8$ reactions, 3583

de Josselin de Jong, G. Consolidation around po pressure meters, 7197

Dekeyser, W. *See* Gevers, R., 2055; Votava, E., 44

De Keyser, W. L. Differential thermobalance: a ne research tool, 8249

Dekhtyar, I. Ya. Dependence of the coefficient diffusion on the interatomic interaction in meta and alloys, 7968

Dekker, T. J. *See* Clay, J., 2523

de Klerk, D. Adiabatic demagnetization and th temperature scale below 1°K, 1589

de Klerk, D. and Hudson, R. P. Adiabatic dema netization of chromium methylamine alum, 694 The new adiabatic demagnetization apparatus at th National Bureau of Standards, 8376

de Klerk, D., Hudson, R. P. and Pellam, J. R. Secon sound velocity measurements below 1°K, 242 Normal fluid concentration in liquid helium II belo 1°K, 3251

de Laboulaye, H., Tzara, C. and Olkowsky, J. C the phenomenon of ternary fission with a third fra ment of short range, 8689

Delahaye, J. *See* Jenckel, E., 2037

Delain, C. Dielectric constants of isomorpho [specimens of] ammonium phosphate and arsena 5458

de la Marre, P. H. Rheoelectric study of infiltratic problems, 648. *See also* Schneebeli, G., 6513

Delaney, C. F. G. and Poole, J. H. J. The half life calcium 45, 3545, 7065

de Lange, H. Experiments on flicker and some calcul tions on an electrical analogue of the foveal system 2862

de Lange, P. W. Testing the satisfactory operation Geiger-Müller counters and scalers, 6105

de la Perrelle, E. T. *See* Llewellyn Jones, F., 334

de la Ripelle, M. Fabre. The passage from the pe turbation equations to integral equations, 132 Solution of perturbation equations. II. Form the probabilities, 4620

Delattre, P. C. *See* Cooper, F. S., 713*

Delavault, H. A problem in heat conduction and solution by means of Hankel transforms, 8355

Delbecq, C. J. *See also* Yuster, P. H., 5391

Delbecq, C. J. and Pringsheim, P. Absorption ban and lines in irradiated LiF, 6646

Del Castillo, G. *See* Chang, W. Y., 2525

De Leonardis, M. T. *See* Colli, L., 3394

Delfosse, J. M. and de Mévergnies, M. Nève. Constru tion of a Mattauch type mass spectrograph of hi resolving power, 3367

Delhaye, J. The point of maximum frequency in t distribution of proper motions of stars nearer th 20 parsecs, 6432

Delibrias, G. and Labeyrie, J. Properties, maximu doses and intensity measurements of aerosols wi an α radioactivity, 7856

della Corte, M., Fazzini, T. and Franchetti, S. simple controlled Wilson chamber, 3383

Della Corte, M. and Ramat, M. Photomet measurements of tracks in nuclear emulsions, 816

Della Corte, M., Ramat, M. and Ronchi, L., The grain density and the process of track form tion in nuclear emulsions. I. Grain density a developing factor, 8167

Delobeau, F. The stratification $F_{1\cdot5}$ at Dakar and t motion of the sun, 3770

Delord, J. F. *See* Davis, K. E., 310

Delorme, C. *See also* Bertaut, F., 2541

valences in the compound $FeCuO_2$, 5643
l Rosario, L. and Dávila-Aponte, J. Range distribution of sea-level mesons at low geomagnetic latitudes, 942
lville, J. *See* Legrand, C., 5214
Mallemann, R. The rotativity of water vapour, 2392
Mallemann, R. and Suhner, F. Rotativities of ethane and saturated hydrocarbons, 1231
Mallemann, R. Suhner, F. and Grange, J. Variation of the magnetic rotatory power of carbon disulphide as a function of the temperature and of the physical state, 4937. Magnetic rotatory powers of krypton and xenon, 7809
mers, P. Energy loss of highly charged particles produced by fission and by cosmic rays. I. Observations of fission fragments, 1927. Constant height maintenance by aerostats at high altitude, 3402. The asymmetry of fission and the liquid drop model, 3607. *See also* Mathieu, R., 1928
mers, P. and Courtemanche, R. Anisotropy of cosmic rays recorded in photographic emulsions at great altitude, 3415
mers, P., Lapalme, J. and Thouvenin, J. The fading of the latent image due to charged particles, 6369
mers, P. and Lechno-Wasiutynska, Z. Low energy delta rays due to alpha particles and to protons, 1064. Energy loss of highly charged particles produced by fission and by cosmic rays. III. The linear density of delta rays. Experiments, 5529
Mévergnies, M. Nève. *See* Delfosse, J. M., 3367
michelis, F. *See also* Perucca, E., 8200
michelis, F. and Malvano, R. γ-coincidences in $_{84}Po^{214}$, 7110. Cascades in the gamma-ray spectrum of $_{84}Po^{214}$, 8663
mishev, G. K. Method of determining the mechanical parameters of rubber-like materials at acoustic frequencies, 1980
More, W. *See* Wilcox, W. S., 4015
mos, P. T. *See* Winhold, E. J., 447
n Burg, F. A. W. van. *See* van den Burg, F. A. W.
n Dungen, F. H. van. *See* van den Dungen, F. H.
nesuk, S. A. *See* Johns, H. E., 7112
ngler, O. E. *See* Wing, K. G., 8136
nis, P.-M. *See* Béné, G.-J., 4900, 7786
nisse, J.-F. On the control of geomagnetic activity by sunspots, 6425. *See also* Blum, E. J., 8188
nnis, K. S. *See* Pace, E. L., 6737
nnis, N. T. M. *See* Latham, D., 6539
nnison, D. M. *See* Chang, T.-S., 7820
nton, E. J. *See* Pirenne, M. H., 2114
Oyarzabal, J. Scattering of mesons by mesons, 626
Puymorin, R. d'Aubry. *See* d'Aubry de Puymorin, R.
r Burgt, C. M. van. *See* van der Burgt, C. M.
r Does de Bye, J. A. W. van. *See* van der Does de Bye, J. A. W.
rge, G. *See* Simnad, M. T., 5470
r Held, E. F. M. Van. *See* Van der Held, E. F. M.
r Maesen, F. van. *See* van der Maesen, F.
r Mateosian, E. and Smith, A. A scintillation spectrometer study of the decay of Tl^{204}, 1069
r Mateosian, E. and Yuan, L. C. L. The surface effect of sodium iodide scintillators, 5970
ruyttere, A. E. and Greenough, G. B. Cleavage fracture of zinc single crystals, 8724
r Walt, N. van. *See* van der Walt, N.
ryagin, B. V. *See* Budnevich, S. S., 6278; Karasev, V. V., 7709
r Ziel, A. van. *See* van der Ziel, A.
Sabbata, V. *See* Puppi, G., 7908
sai, U. D. *See* Sarabhai, V., 4190
schamps, Y. and Avignon, P. γ-radiation from the transition $Sn^{113}In^{113}$, 4320
ser, S. and Martin, P. C. A covariant meson-nucleon equation, 5861
-Shalit, A. On the measurement of the K/L capture ratio, 405. Effects of departures from the single particle model on nuclear magnetic moments, 4285. *See also* Mihelich, J. W., 7080
shmukh, M. B. Ozonizer discharge, 4129. Time lag in Joshi-effect, 7700
smyter, A. *See* Mathot, V., 5448
sneiges, P. A time selector for measuring the time of flight of neutrons, 4883. *See also* Teillac, J., 7893
specific heat of gallium, 3271. Concerning the low temperature specific heat of tellurium, 4771. Specific heat of diamond at low temperatures, 5446. The specific heat of crystalline selenium at low temperatures, 6736
d'Espagnat, B. On the mean life of the V_1^0 particle, 3611. The π-nucleon scattering and the reaction: nucleon (π, 2π) nucleon, 7952. The effective cross-section for the reaction $p(\pi^+, 2\pi^+)_n$ in the neighbourhood of the threshold, 8699
Desprez, R. *See* Morand, M., 3414
Desprez-Rebaud, S. On the ratio of the number of mesons to the number of heavy particles observed in nuclear emulsions exposed at Puy-de-Dôme, 2520
Despujols, J. Point-focus monochromator for X-rays, 1254. Construction of pseudo-spherical concave mirrors to give enlarged images with X-rays, 4130
Dessens, H. The microstructure and artificial precipitation of a supercooled fog, 2847
Destouches, J.-L. On the physical interpretation of the quantum theories, 600
Destouches-Aeschlimann, F. The derivative and total differential of an operator, 2937. Operational integrals and the extension of wave mechanics, 4622
Destouches-Février, P. Predictions and the triple-wave method, 5290
Destriau, G. Excitation of luminescence by variable electric fields: primary effect, 7602
Detœuf, J. F. *See also* Blanc, D., 1699; Maignan, P., 5538
Detœuf, J. F., Blanç, D. and Maignan, P. The detection of particles by scintillations. II. Scintillators, 1700
Detœuf, J.-F., Moch, R. and Salmon, J. Double β-radioactivity: systematic search for favourable cases, 5683
Detwiler, D. P. and Fairbank, H. A. The thermal resistivity of superconductors, 865
Deutsch, M. Critical survey of techniques of beta- and gamma-spectroscopy, 5024
Deutsch, R. W. Secondary particles resulting from 375-MeV alpha-bombardment of nuclei, 5057
Deutscher, K. and Kambe, D. The energy spectrum of canal ray ions, 8436
Deutschmann, M. On the nuclear interaction of fast μ-mesons, 8509
Devaney, J. J. Theory of alpha decay. I, 7880
Deverall, G. V., Meissner, K. W. and Zissis, G. J. Hyperfine structures of the resonance lines of indium (In^{115}), 6611. Selection of optimal spacers in Perot–Fabry interferometry, 7609
Devey, G. B. [Transl.]. Ultrasonic microscope, 8298
Devienne, F. M. Variation of the condensation factor of molecular jets of antimony and cadmium as a function of the support and of the thickness of the layer, 7180
de Vogelaere, R. Non-existence of periodic orbits in the Störmer problem for certain values of the parameter γ, 3416
Devons, S. Charge independence and nuclear reactions, 8640
de Vooren, A. I. van. *See* van de Vooren, A. I.
DeVore, H. B. Photoconductivity study of activation of barium oxide, 3397
De Vos, P. J. G. and Gey van Pittius, E. van A. Investigation on the low energy end of the cosmic proton and meson spectrum at sea-level by applying a differential absorption method, 6920
de Vries, H. and Barendsen, G. W. On the breakdown of Geiger–Müller counters at high overvoltages, 2503. A new technique for the measurement of age by radiocarbon, 3764
De Vries, H., Spoor, A. and Jielof, R. Properties of the eye with respect to polarized light, 8141
de Vries, L. J., Clay, J. and Veringa, F. T. Accurate half life determination, 4981
de Vries, L. J., Veringa, F. T. H. and Clay, J. Half life determination of ^{31}Si by a precision-method and a preliminary result on ^{83}Kr, 3542
de Vrijer, F. W. and Gorter, C. J. On paramagnetic relaxation in chromium alum, 2542

Devyatkova, E. D., Maslakovets, Yu. P., Stil'bans, L. S. and Stavitskaya, T. S. On the temperature dependence of the mobility of charge carriers in semiconductors, 5467

Devyatkova, E. D. and Stil'bans, L. S. Investigation of the influence of atomic admixtures on the thermal conductivity of the crystal lattice, 796

Dew, G. D. On the preparation of plane diffraction grating replicas from helical rulings, 6675

Dew, R. J., Jr. Barium titanate and related subjects, 828

de Waard, H. A high resolution coincidence instrument with scintillation counters. Delayed and prompt coincidences in the decay of ^{181}Hf, 4879

de Waard, H. and Martini, J. E. P. The use of solid solutions of para-terphenyl and tetraphenylbutadiene in polystyrene as scintillation phosphors, 3152

de Waele, A. and Lewis, G. L. The rheological curve, 8726

Dewan, J. T. *See* Almqvist, E., 8674

Dewar, M. J. S. A molecular theory of organic chemistry. I. General principles. II. The structure of mesomeric systems. III. Charge displacements and electromeric substituents. IV. Free radicals. V. Theories of reactivity and the relationship between them. VI. Aromatic substitution and addition, 3701. Molecular orbital theory of organic chemistry, 3702

Dewdney, J. W. *See* Duckworth, H. E., 2632

Dewes, R. A. *See* Schultz, W. W., 6831

de Wet, J. F. *See* van Niekerk, J. N., 8113

Dewhirst, D. W. The identification of radio sources, 8185

de Wijs, H. *See* Aten, A. H. W., Jr, 5004

De Witt, C. M. and Jensen, J. H. D. The angular momentum of multipole radiation, 6465

Dexter, D. L. A theory of sensitized luminescence in solids, 5404. The small angle scattering of X-rays from cold-worked solids, 6251

Dexter, D. L. and Heller, W. R. Quantum theory of the polarizability of an idealized crystal, 7292

Diamond, R. M. Molybdenum 90, 4301

Dias Tavares, A. Further experiments of the thermodielectric effect [Costa Ribeiro effect], 6761. On a possible explanation of the Costa Ribeiro effect, 6762

Díaz, E. P. *See* Torroja, J. M., 5204

Dibeler, V. H. Mass spectra of the tetramethyl compounds of carbon silicon, germanium, tin, and lead, 3393

Dibeler, V. H., Mohler, F. L. and Reese, R. M. Ionization and dissociation of methyl siloxanes by electron impact, 3389

Dick, J. L. *See* Cheng, L. S., 1067

Dicke, R. H. The effect of collisions upon the Doppler width of spectral lines, 2334

Dickey, F. R., Jr. Contribution to the theory of impulse breakdown, 1653

Dickey, J. *See* Apker, L., 2461

Dickinson, W. C. and Dodder, D. C. Evaluation of particle loss due to multiple scattering in foils, 6088

Dickson, J. M. and Salter, D. C. Energy spectrum measurements of protons in the Harwell cyclotron, 6858. A search for polarization of high energy neutrons, 7189

Dickson, J. M., Salter, D. C., Gunnill, O., Dolley, P. and Cassels, J. M. A fast coincidence circuit for experiments with high energy particles, 1703

Dieke, G. H. *See* Steinhaus, D. W., 3975

Diemer, G. *See* Alma, G. A., 7712

Dienes, G. J. Mechanism for self-diffusion in graphite, 1169. Entropies of activation in metallic diffusion, 1962. Activation energy for viscous flow and short-range order, 5875. Effects of nuclear radiations on the mechanical properties of solids, 6219. *See also* Bartlett, J. H., 3476; Feldman, M. H., 1170

Diercks, H. and Hunger, K. Determination of stellar diameters from the diffraction of light-rays at star-occultations, 5841

Dietrich, C. F. *See* Craig, H., 3353

Dietrich, I. Experiments on the superconductivity of contacts, 4813

Dietrick, H. *See also* Yeager, F., 5748

Dietrick, H., Yeager, E., Bugosh, J. and Hovorka, F. Ultrasonic waves and electrochemistry. III. An electrokinetic effect produced by ultrasonic wav 5749; IV. The production of alternating componer in the potential of a polarized hydrogen electro with ultrasonic waves, 5750

Di Francia, G. Toraldo. New super-resolving pupi 3182. On the characteristics of the electromagne properties of isotropic bodies, 3445. Utilization the results of ray trace calculations in an optic system, 3967. A fundamental theorem of parage metrical optics, 4677. *See also* Fiorentini, A., 308 Ronchi, L., 3084–5, 3181, 4038

Di Francia, G. Toraldo and Ronchi, L. Directio scattering of light by the human retina, 571

Digiovanni, H. J., Graveson, R. T. and Yoli, A. Scintillation unit for drill-hole logging, 6891

Dijck, G. van. *See* van Dijck, G.

Dijkstra, H. and Sieswerda, B. S. An automa colorimeter, 4046

Dijkstra, L. J. and Martius, U. M. Domain pattern silicon-iron under stress, 8604

Dillon, T. J. Neon indicator tubes as quantitati detectors in photometry, 7539

Dilworth, C., Goldsack, S., Hoang, T. F. and Scar L. Observation of "jets" of large and small apertu in photographic emulsions, 7120

Dimmick, F. L. *See* Smith, S. W., 6339

Dingle, R. B. The reflectivity of metals in the infra-re 1557. The propagation of pulses of first a second sound through helium II, 2419. The veloci of second sound in various media, 2420. So magnetic properties of metals. V. Magnetic b haviour of a cylindrical system of electrons for magnetic fields, 3421. The solution of the Schr dinger equation for finite systems, with spec reference to the motion of electrons in Coulom electric fields and uniform magnetic fields, 388 The anomalous skin effect and the reflectivity metals. I, 6787; II. Comparison between theoretic and experimental optical properties, 6788. So magnetic properties of metals. VI. Surface corre tions to the Landau diamagnetism and the de Haa van Alphen effect, 8511

Dippner, H. and Zemke, H.-J. A review of reverber tion times of sound-recording and reproducing roo in Berlin, 4672

Dirac, P. A. M. Gauge transformations in electr dynamics, 6461*

Dissanaike, G. A. A study of charge exchange by heliu ions in metals, 8477

Ditchburn, R. W. Light, 98

Ditchburn, R. W. and Heavens, O. S. Relativist theory of a rigid body, 1357

Ditchburn, R. W., Jutsum, P. J. and Marr, G. The continuous absorption of light in alkali-met vapours, 6644

Ditchburn, R. W. and Marr, G. V. The continuo absorption of light in magnesium vapour, 8325

Ditzenberger, J. A. *See* Fuller, C. S., 7196

Divan, L. Comparison of the law of variation of int stellar absorption with wavelength in three differe regions of the Galaxy, 7. Researches on the co tinuous spectra of stars. VI, 2916. Law of variati with wavelength of the coefficient of continuo absorption of interstellar matter, 7388. *See al* Berger, J., 11, 7389; Chalonge, D., 2916

Dixit, K. R. The processing of nuclear emulsions to 200 microns, 2879. Associated pairs of pen trating particles and other events observed at mou tain altitudes with photographic emulsions, 3405

Dixon, C. E., Meechan, C. J. and Brinkman, J. Bombardment of ordered Cu_3Au by 1 MeV ele trons, 8452

Dixon, W. R. and Whyte, G. N. Search for anomalo absorption of Ra(B + C) γ rays, 7097

Dizer, M. A study of cine-films of the solar chrom sphere at the border of the disk, 1341

Dizioğlu, B. On the theory of heat transfer in paral oil layers, 6703

Djurle, E. *See* Ingelstam, E., 5424, 6674

Doak, G. O. *See* Jaffé, H. H., 2797

Doak, P. E. The reflexion of a spherical acoustic pu by an absorbent infinite plane and related problem 1463

Doane, E. P. and Drickamer, H. G. The effect pressure on diffusion in the system CCl_4–SnI_4, 749

AUTHOR INDEX

obischek, D., Jacobs, H. and Freely, J. The mechanism of self-sustained electron emission from magnesium oxide, 7725

obretsov, L. N. and Karnaukhova, N. M. Determination of the coefficients of cathode disintegration of metals by ions of the same metals, 7696

obretsov, L. N., Lepeshinskaya, V. N. and Bronshteĭn, I. E. Neutralization of potassium and sodium ions on tungsten and tantalum, 939

obrin, M. B. *See* Clewell, D. H., 7341

obrolyubskaya, T. S. Phosphors on a basis of magnesium arsenate, activated by manganese, 7587

obrovol'skiĭ, S. I. *See* Gubkin, S. I., 7616

o Carmo Anta, M. *See* Haissinsky, M., 5759

odd, E. E. The statistics of liquid spray and dust electrification by the Hopper and Laby method, 2433

odd, K. N. A case of gaseous accretion, 8198

odd, L. E. The closed differential pulley: analysis of its rotational and linear motions, 2214

odd, R. E. The photolysis of acetaldehyde, 5168

Dodder, D. C. *See also* Dickinson, W. C., 6088

Dodder, D. C. and Gammel, J. L. Elastic scattering of protons and neutrons by helium, 1689

Dodo, T. and Utiyama, R. On the equivalence principle, 3871

Dodson, H. W., Hedeman, E. R. and Chamberlain, J. Ejection of hydrogen and ionized calcium atoms with high velocity at the time of solar flares, 3809

Does de Bye, J. A. W. van der. *See* van der Does de Bye, J. A. W.

Doescher, R. N. *See* Elverum, G. W., Jr, 1404

Dogra, O. P., Bhatawdekar, M. G. and Ramaiah, N. A. A note on secondary processes in a low-frequency electrodeless discharge, 7702

Dogra, O. P. and Ramaiah, N. A. An analogue of Joshi effect with thermoelectrons, 7701

Dolan, W. W. Current density tables for field emission theory, 7711. *See also* Dyke, W. P., 6834

Dole, M. On the statistical theory of crystallite length, 3516

Dolginov, A. Z. Angular β-particle distribution in the β-disintegration of heavy nuclei, 1070. β–γ angular correlation for heavy nuclei, 1071. Angular correlations in a many step cascade transformation of a nucleus, 5678

Dolley, P. *See* Dickson, J. M., 1703

Dollfus, A. The [optical] polarization curve for the earth, and the nature of the lunar surface, 1352. A double-image micrometer allowing of wide [image] separation, 2904. The intensity of the line 6374 Å and the temperature of the solar corona, 5280

Domb, C. Tables of functions occurring in the diffraction of electromagnetic waves by the earth, 4932

Domb, C. and Salter, L. The zero point energy and θ values of crystals, 2056

Dominici, P. *See* Bolle, A., 7807

Donahue, D. J. *See also* Craig, D. S., 1111; Jones, K. W., 7862

Donahue, D. J., Jones, K. W., McEllistrem, M. T. and Richards, H. T. Electrostatic analysis of nuclear reaction energies. III, 2693

Donaldson, D. M. and Robertson, J. M. The crystal and molecular structure of octamethylnaphthalene: a non-planar naphthalene derivative, 5785

Donavan, T. W. *See* Kundu, D. N., 4343

Donder, T. de. *See* de Donder, T.

Donnelly, R. J. *See* Johns, M. W., 397

Donnert, H. Derivation of mathematically equivalent tensor equations from Dirac's equations for the wave fields of elementary particles of non-zero mass and arbitrary integral spin, 7443

Donnet, J. B. Contribution to the study of the dimensions of rigid macromolecules. Comparison of the results of the electron microscope and of the hydrodynamic laws. I. The fundamental theories of the hydrodynamic methods used for the determination of the form and dimensions of rigid particles, 8628; II. Experimental methods used in our study, 8629

Donoghue, J. J. *See* McClelland, J. D., 6956

Donohue, J. Crystal structure of histidine hydrochloride monohydrate, 3752

Donovan, G. E. and Stafford, E. Colour in electron microscopy, 2488

Donth, H. *See* Seeger, A., 6268

Doodson, A. T. *See* Corkan, R. H., 1353

Dooling, J. S. Effect of 3*p* atomic orbital on energy of the double bond, 5641

Doolittle, A. K. Comment on the temperature dependence of the viscosity of liquids, 7480

d'Or, L. and Orzechowski, L. On promotion in heterogeneous catalysis, 507. Further researches on promotion in heterogeneous catalysis, 508

Dörmann, H. The magnetic tape recorder in near tremor recording, 4490

Dormont, H. On the calculation of contact potential differences, 5451. On contact phenomena, 5452. *See also* Morilleau, E., 4880

Dorogan', V. I. *See* Glauberman, A. E., 5611

Dörr, F. and Engelmann, F. Magnetic measurements on phototropic substances, 973

Dörr, G. *See* Altenburg, K., 1214

Dörr, J. Examination of some integrals involving Bessel functions, which are of importance in elasticity theory, 6497

Dorre, E. *See* Schubert, K., 8097

Dostrovsky, I., Gillis, J., Llewellyn, D. R. and Vromen, B. H. The separation of isotopes by fractional distillation. II. Determination of parameters from production data. Value of the unit process separation factor for the $H_2{}^{16}O$-$H_2{}^{18}O$ system, 3708

Dostrovsky, I., Gillis, J. and Vromen, B. Optimal flow in fractionating columns for isotope separation, 523

Dostrovsky, I., Llewellyn, D. R. and Vromen, B. H. The separation of isotopes by fractional distillation. I. Fractionating columns for the enrichment of the heavy isotopes of oxygen in water, 3707

Doucet, Y. The ideal cryometric criterion and the application of Arrhenius' theory, 5438. *See also* Amiot, R., 8032

Doucet, Y. and Chauchefoin, P. Control by a continuous action thermostat, 814

Douglas, A. E. Analysis of the $^2\pi$–$^2\Sigma$ bands of the N_2^+ molecule, 8315

Douglas, A. E. and Sharma, D. Rotation-vibration spectra of diatomic and simple polyatomic molecules with long absorbing paths. IX. The spectra of the HCN and DCN molecules from $2\cdot5\,\mu$ to $0\cdot5\,\mu$, 3141. *See also* Cochran, W., 7314

Douglas, A. S. [Conf. rep.]. Numerical methods and automatic computing in [extra-nuclear] atomic theory, 7025

Douglas, J. E. *See* Rabinovitch, B. S., 1229

Douglas, R. A. *See* Jones, K. W., 7862

Doumerc, J. *See* Faraggi, H., 2129

Douslin, D. R. *See* Beattie, J. A., 74

Dousmanis, G. C. *See also* Sanders, T. M., Jr, 4022

Dousmanis, G. C., Sanders, T. M., Jr, Townes, C. H. and Zeiger, H. J. Structure of HNCS from microwave spectra, 8622

Dovey, D. M., Jenkins, I. and Randall, K. C. Diffusion coatings, 4400

Dowd, J. J. *See also* Billig, E., 8404

Dowd, J. J. and Rouse, R. L. Distribution coefficient of indium in germanium on crystallization, 4407

Dowdy, A. H. *See* Greenfield, M. A., 1683

Dowling, P. H. and Sewell, J. R. Saturation and voltage effects in cathodoluminescence, 3172

Downie, A. *See* Cowan, G. R., 8732

Downie, A. R. *See* Barrow, R. F., 3992

Downing, A. C. *See* Copeland, K., 3295

Dragesco, J. Observation and photography of ciliary infusoria in phase contrast, 3227

Draginić, I. The fluorimetric determination of uranium in ores, 4460

Dragsdorf, R. D. Crystal alignment on the Weissenberg goniometer, 3739

Drain, L. E. *See also* Cooke, A. H., 1827; Morrison, J. A., 2796

Drain, L. E. and Morrison, J. A. Interpretation of the thermodynamic properties of adsorbed argon at low surface coverages, 5176

Dranen, J. van. *See* van Dranen, J.

Dransfeld, K. *See* Schaefer, C., 3193

Drechsler, M. and Müller, E. W. On the field emission and work function of individual crystal surfaces, 6078

Drell, S. D. *See also* Lawson, R. D., 5719

Drell, S. D. and Henley, E. M. Pseudoscalar mesons with applications to meson-nucleon scattering and photoproduction, 630

Drell, S. D. and Rose, M. E. Zero-zero transitions, 420

Dresel, E. M. and Roberts, L. E. J. Closed pores in synthetic graphite, 3633

Dresner, L. Spin-orbit coupling in pseudoscalar meson theory, 7457

Dressler, R. F. and Pohle, F. V. Resistance effects on hydraulic instability, 6516

Drew, C. M. *See* Ernsberger, F. M., 2979

Dreyfus-Alain, B. X-ray diffraction study of the absorption of deuterium by lanthanum, 7325

Drickamer, H. G. *See also* Caskey, F. E., 2251; Cova, D. R., 7497; Cuddeback, R. B., 3923–4; Doane, E. P., 7495; Jeffries, Q. R., 7504; Keeller, R. C., 2248, 3922; Saxton, R. L., 7496

Drimmer, B. E. Average temperatures by parallel-connected thermocouples, 4063

Dropesky, B. and Wiig, E. O. Three new neutron deficient xenon isotopes, 1061

Drouard, E. and Mathieu, J.-P. Optical activity of the bromide of cobalt III triethylene diamine in the crystalline state and in solution, 7810

Drubba, H. *See* Rust, H. H., 8300

Drucker, D. C. and Prager, W. Soil mechanics and plastic analysis or limit design, 1167

Drummeter, L. F. *See* Curcio, J. A., 2851

Drummond, D. G. [Conf. rep.]. Summarized proceedings of a conference on the optical and electron-microscopical properties of textile fibres—Manchester, October 1952, 5127

Drummond, G. *See* Barrow, R. F., 4001

Dryden, J. S. Temperature dependence of the dielectric properties of long-chain aliphatic alcohols in the solid state, 1609

Dryden, J. S. and Meakins, R. J. Electrical conductivity of certain crystalline materials after grinding, 3294

Dube, G. P. *See* Jha, S., 5680

Dubinina, E. M. *See* Spivak, G. V., 7718

Dubois, M. Hydrogen jets sensitive to ultrasonic vibrations. The flow of hydrogen jets in air, 5327. Jets of water sensitive to sound, 7534

Dubois-Violette, P.-L. Application of the method of fusion of roots to the study of the stability of the automatic regulation of a heat exchanger, 1591

Dubreil-Jacotin, M.-L. Algebraic properties of Reynolds' transformations, 5321

Dubrovskiĭ, V. G. *See* Annaev, R. G., 7689

Duchesne, J. Relations between molecular structure, vibrations and chemical reactivity, 995. Nuclear quadrupole coupling constants and molecular vibrations, 1013. Excited electronic states and molecular vibrations of thiophosgene, 3501. *See also* Monfils, A., 4944

Duchesne, J. and Nielsen, A. H. Vibration potential function of the ClO_2 molecule, 1810

Duchesne, M. A light receiver of very high sensitivity: the electronic telescope. Study and improvement, 4557. *See also* Lallemand, A., 6

Duckworth, H. E. *See* Geiger, J. S., 2632; Hogg, B. C., 7052–3

Duclaux, J.-P. E. Method of calculating the vapour pressure of water between 0° and 100°C, 7625. Calculation of the vapour pressure of water from 0° to 100°C: formula for this pressure between −20° and +200°C. Volume of the vapour. Heat of vaporization, 8359

Dudavskiĭ, I. E. Apparatus for X-ray structural analysis using high intensity sources, 2070

Dudley, J. M. *See* Rosengren, J. W., 2705

Duerig, W. H. and Markham, J. J. Color centers in alkali halides at 5°K, 1251

Dufay, J. Investigation of the forbidden lines ^2D-^2P of neutral nitrogen in the absorption spectrum of the sun's atmosphere, 4571

Dufay, M. Intensity of the ^4S–^2D line of atomic nitrogen at twilight, 8131

Duff, R. E. The interaction of plane shock waves and rough surfaces, 680

Duff, R. E. and Knight, H. T. An experimental investigation of spinning detonation, 504

Duffey, G. H. The structure of B_4Cl_4, 5642

Duffield, R. B. *See also* Huizenga, J. R., 1136

Duffield, R. B. and Huizenga, J. R. Photofission an photoneutron emission in uranium, 3598

Duffield, R. B. and Langer, L. M. The decay of Zn 2661

Duffieux, P. M. Remarks on the differential laws image deformation, 3968. Partial coherence an transmission functions, 4044. The theory of imag and radiation, 5369. The "enlarged pinhole," 54

Duffus, H. J. *See also* Bogle, G. S., 378; Cooke, A. H 7630

Duffy, P. A. *See* Cole, D. P., 924

Dufour, C. The properties of an interference filter the Fabry-Pérot type used as a phase plate, 3207

Dufour, C., Herpin, A., Thomas, J. P. and Wendt, C Method of measuring the induced conductivity an secondary emission of insulators under electron bombardment, 8450

Dufour, L. Can rain be produced artificially? 2856 The surface tension of a cloud drop, 5892

Dufour, L. and Defay, R. Temperatures of cc existence of ice crystals and drops of salt solutio in the atmosphere, 5243

Dugas, R. On the interpretation of quantum mechanic with the aid of hidden variables in the sense c David Bohm, 6452

Dugdale, J. S. *See also* Morrison, J. A., 2796

Dugdale, J. S. and MacDonald, D. K. C. Th thermal expansion of solids, 2405

Dugdale, J. S. and Simon, F. E. Thermodynami properties and melting of solid helium, 6725

Dugdale, R. A. The extra electrical resistance due t cold work and neutron irradiation of platinum, 243 *See also* Adam, J., 3730

Düker, H. *See* Möllenstedt, G., 3337, 6841

Duller, N. M. *See* Walker, W. D., 4896

du Marache, J. Gaultier. Applications of Fourie integrals to photographic images. I–II, 1323; III 2871

Dumas, G. *See* Bayet, M., 6542

Dumbleton, M. J. and Howlett, B. W. Yield points in bending experiments on zinc crystals, 1988

Dumézil-Curien, P. Relationship between period mean spectral type and phase difference for th Cepheids, 1347. Compression waves in an atmo sphere in radiative equilibrium, 2160

DuMond, J. W. M. *See* Henke, B., 5206; Hoyt, H. C. 5038, 8665; Muller, D. E., 1084

Dumont, R. *See* Bigay, J. H., 7404

Dumontet, P. *See* Blanc–Lapierre, A., 5378

Dumoré, J. M. *See* Prins, J. A., 2398

Dunavan, D. S. *See* Boley, F. I., 4991

Dunbar, A. S. Astigmatic diffraction effects in micro- wave lenses, 5587

Duncan, A. B. F. *See* Moe, G., 3144–5; Wagner, P., 3147

Duncan, N. E. and Janz, G. J. The thermal dimerization of butadiene and the equilibrium between butadiene and vinylcyclohexene, 500

Duncan, W. J. Physical similarity and dimensional analysis, 7411

Duncanson, W. E. *See also* Heyland, G. R., 3412–13

Duncanson, W. E. and Coulson, C. A. Studies in graphite and related compounds. II. Momentum distribution in graphite, 345

Dungen, F. H. van den. *See* van den Dungen, F. H.

Dungey, J. W. Theories of magnetic storms and auroræ, 1274. A theoretical model for arches in the solar corona, 4563. Conditions for the occurrence of electrical discharges in astrophysical systems, 7386. Origin of cosmic rays, 7755

Dunitz, J. D., Feldman, H. G. and Schomaker, V. The molecular structure of cyclopropene, C_3H_4, 1018

Dunitz, J. D. and Orgel, L. E. *Bis-cyclo*pentadienyl iron: a molecular sandwich, 2835

Dunitz, J. D. and Schomaker, V. The molecular structure of cyclobutane, 1017

Dunlap, R. Solutions of fluorocarbons and hydrocarbons; the energy of mixing, 8006

Dunlap, R. D. *See* Simons, J. H., 70

Dunlap, W. C., Jr. *See* Saby, J. S., 6049

Dunn, R. W. Techniques related to the production of Fe^{59}, 427

Dunning, K. L. *See* Bergstralh, T. A., 6859 noyer, J.-M. Experiments on the rate of diffusion of a vapour in a gas, 1425. *See also* Bouttier, L., 5205

nsmuir, P. A simple goniometric method for examining preferred orientation in etched metal polycrystals, 2054

peyrat, M. A self-registering apparatus with high resolution for Raman spectrography, 5412

pouy-Camet, C. Focuses of best sharpness and best resolution for an objective having aberration of the 3rd order, 8307

quesne, M. A study of the genuine coincidences observed during the disintegration of P^{32}, 5021

rand, E. Determination of an electron trajectory by successive integration, 4837. Determination of an electron trajectory by successive differentiation, 4838. Huyghens' principle and the diffraction of the electron in Dirac theory, 6467. General solutions of Maxwell's equations, 6962. *See also* Bergstralh, T. A., 6859

rand, H. *See* Ambler, E., 5653

randeau, P. A suspended system for the electrodynamic measurement of the field along the axis of a magnetic electron lens, 5562

rbin, R. P. *See also* Goodell, W. F., Jr., 2692

rbin, R. P., Loar, H. H. and Havens, W. W., Jr. The lifetimes of the π^+ and π^- mesons, 471

ret, M. F. *See* Preston, M. A., 1937

rif, A. *See* Bertaut, F., 3744

rkee, R. W. *See* Kemp, J. W., 791

rr, W., Jauman, J. and Seiler, K. Solubility and ionizability of impurities in germanium single crystals, 4090

ryee, W. R. *See* Bush, V., 8353

tt, M. N. Diffuse spots of pyrene at higher temperatures, 3749

tta, A. K. Molecular motion in fluids and internal dispersion and absorption of elastic and optical waves, 3001. Ultrasonic absorption and relaxation mechanism, 3947. Electrical conductivity of single crystals of graphite, 4086

utta, A. K. and Mukherjee, S. K. Experiments on the internal dispersion of supersonic waves in liquids, 3000

utta, M. On Bagchi's calculation of activity coefficients by the method of Gronwall and his collaborators, 2786. On the distribution of ions in electrolytic solutions, 6290

utton, D. and Maurer, R. Color centers and trapped charge in KCl and KBr, 4478

utton, J., Haydon, S. C. and Jones, F. Llewellyn. Photo-ionization and the electrical breakdown of gases, 6063. Formative time lags in the electrical breakdown of gases, 6812

uus, H. C. *See* McGeer, P. L., 818

uval, C. *See also* Pain, C., 7567

uval, C. and Lecomte, J. A study, by means of infrared absorption spectra, of some reactions in the solid state, 3679

uval, J. E. *See* Haskins, J. R., 1075

uwez, P. The effect of the rate of cooling on the allotropic transformation temperatures of uranium, 3241

vorak, H. R. and Little, R. N., Jr. Total cross-sections of chlorine, sodium, titanium, and bromine for fast neutrons, 5085

workin, A. S., Sasmor, D. J. and Van Artsdalen, E. R. T^2 dependence of the low temperature specific heat of boron nitride, 6015

'yakov, G. P. Generalization of the law of approach to saturation of even effects, 5602. Theory of magnetostriction and of the other even effects in strong magnetic fields, 5603

yakov, V. A., Sivanov, V. S. and Daube, Ya. Ya. On the rationalization of methods of calculating the correct proportions for the ingredients of the charges of metallurgical furnaces, 2118

yer, A. J. The absorption of the hard component of cosmic rays in water, 4187

yer, A. J. and Bird, J. R. Neutrons emitted in the disintegration of beryllium by deuterons, 4351

yer, I. *See* Mawardi, O. K., 5361

yke, M. D. van. *See* van Dyke, M. D.

yke, W. P. and Trolan, J. K. Field emission: large current densities, space charge, and the vacuum arc, 2479

Dyke, W. P., Trolan, J. K., Dolan, W. W. and Barnes, G. The field emitter: fabrication, electron microscopy, and electric field calculations, 6834

Dȳkman, I. M. and Pekar, S. I. Overtones in ionic crystals, 5779

Dymond, E. G. Apparent absence of low-energy primary cosmic radiation, 1718. *See also* Pullar, J. D., 7775

Dyne, P. J. The absorption spectra of free radicals formed in an electric discharge, 4013

Dyson, F. J. The use of the Tamm–Dancoff method in field theory, 5854. *See also* Baranger, M., 606

Dyson, J. The interference microscope, 3200 An interferometer microscope for opaque objects, 4047. An interferometer microscope for the accurate measurement of optical thickness, 4742

Dzcubas, W. *See* Aten, A. H. W., Jr, 3584

Dzhelepov, B. *See also* Gromov, K., 7889

Dzhelepov, B. and Silant'ev, A. γ-Ray spectrum of Br^{82}, 7890

Dzhelepov, B. S. *See also* Bashilov, A. A., 5684

Dzhelepov, B. S., Zhukovskiĭ, N. N. and Khol'nov, Yu. V. Gamma radiation of Fe^{59}, 5689

Dziergwa, H. The afterglow of cadmium borate, 6654

Eades, R. G. *See* Andrew, E. R., 4267, 6985

East, T. W. R. *See* Marshall, J. S., 2571

Eastabrook, J. N. Effect of vertical divergence on the displacement and breadth of X-ray powder diffraction lines, 541. The effect of vertical divergence on X-ray powder diffraction lines, 7313

Eastabrook, J. N. and Hughes, J. W. Elimination of dead-time corrections in monitored Geiger-counter X-ray measurements, 8472

Easterday, H. T. The radioactivity of Cu^{67}, 7877. *See also* Crasemann, B., 7075

Easterday, H. T., and Medicus, H. A. Isomeric transitions in Tc^{93} and Tc^{96}, 2660

Eatherly, W. P. and McClelland, J. D. Anisotropic susceptibility of polycrystalline graphite, 2533

Eaton, J. E. On spherically symmetric lenses, 5588

Ebe, M. *See* Motokawa, K., 4528

Ebel, M. E. and Fry, W. F. Atomic electron ejection in large-angle scattering, 1851

Eberle, J. *See* Schaefer, C., 8349

Ebinger, A. Portable temperature-indicating instruments for connection to thermocouples, 193

Eckardt, A. and Elschner, B. Electron microscopical investigations of ferromagnetic domains, 6260

Eckardt, A., Lindig, O. and Nitzsche, K. On the homogenization of ultrasonic fields in water, 8282

Eckart, C. The theory of noise in continuous media, 3039. The scattering of sound from the sea surface, 5348. Relation between time averages and ensemble averages in the statistical dynamics of continuous media, 7471

Eckart, F. Fluorescent coatings and films with polyvinyl alcohol as a protective medium and binding material, 2366. Noise measurements on thin lead sulphide photolayers, 2448. The development of secondary emission multipliers, 4860

Eckelman, W. R. *See* Kulp, J. L., 1046

Ecker, G. The space charge zone at the [electrode] limit of an arc plasma, 6815

Eckert, E. R. G. Introduction to the transfer of heat and mass, 797

Eckert, E. R. G. and Soehngen, E. Distribution of heat-transfer coefficients around circular cylinders in crossflow at Reynolds numbers from 20 to 500, 177

Eckl, D. J. The decay of the populations of neon atoms in the $2p^53s$ levels, 7044

Eddi, R. *See* Ferrié, F., 7619

Edelman, S. *See* Jones, E., 2303

Edels, H. Self-absorption in arc sources in thermal equilibrium, 131. Dependence of glow to arc transitions on cathode surface conditions, 8437

Eden, R. J. Quantum field theory of bound states. I. Bound states in weak interaction, 1389; II. Relativistic theory of resonance reactions, 4597

Eden, R. J. and Rickayzen, G. Quantum field theory of bound states. III. Bound states in strong interaction, 6462

Eder, F. X. The measurement of dynamic strength of plastic materials, 6274

Eder, G. Spin-orbit coupling according to pseudoscalar theory, 5303

Edgar, M. *See* Herz, A. J., 4549

Edge, R. D. *See* Carver, J. H. 2709, 7926

Edgell, W. F. and May, C. E. The Raman and infra-red spectra of CF_3Br and CF_3I, 755

Edlén, B. The dispersion of standard air, 4690

Edlund, M. C. *See* Glasstone, S., 7939

Edmonds, A. R. Nuclear binding energies and the *jj*-coupling shell model, 8636

Edmonds, A. R. and Flowers, B. H. Studies in *jj*-coupling. III. Nuclear energy levels, 1833

Edmonds, F. N., Jr. Compton scattering by electrons with a Maxwellian distribution of thermal velocities, 4327

Edmondson, R. B. *See also* Olsen, H. L., 186

Edmondson, R. B., Gayhart, E. L. and Olsen, H. L. Radial symmetry in a schlieren image, 1565

Edsall, J. T., Rich, A. and Goldstein, M. An instrument for the study of double refraction of flow at low and intermediate velocity gradients, 1563

Edwards, D. A. *See* Tongiorgi, V. Cocconi, 470

Edwards, D. F. *See* Green, A. E. S., 7034

Edwards, D. H. *See* Childs, E. C., 3634

Edwards, G. *See* Emiliani, C., 7346

Edwards, J. O. Rate laws and mechanism of oxyanion reactions with bases, 1201

Edwards, P. D. and Kerst, D. W. The determination of photon flux for energies between 150 and 300 MeV, 7109

Edwards, R. R. *See* Damon, P. E. 4326

Edwards, S. F. The interaction of alpha-particles and the binding energy of ^{8}Be, 1839. A nonperturbation approach to quantum electrodynamics, 3865

Efrussi, M. M. *See* Tartakovskii, B. D., 2296

Egelstaff, P. A. and Jackson, R. Slow-neutron scattering cross-sections of magnesium, 8708

Egerton, A. C. and Warren, D. R. Effect of withdrawal-rate on second explosion limits, 501

Eggert, J. Remarks on the Schwarzchild effect, 6352. *See also* Berchtold, J., 6295

Eggleston, R. R. Cold work studies on copper at low temperatures, 1992

Eggleston, R. R. and Bowman, F. E. Radiation damage of beta-brass, 3731

Egorov, Yu. P. and Bazhulin, P. A. Optical method of investigating silico-organic hydrocarbons. Raman spectra of alkenyl silanes, 7594

Eguchi, T. On the constitution of copper-gold alloy, 343

Egyed, L. Some notes concerning the question of isostasy, 2089

Ehlers, H. and Raether, H. On the structure of thin zinc-oxide layers on zinc single-crystal surfaces, 6307

Ehn, F. *See* Wennerblom, A. 1052

Ehrbahr, J.-P. Study of the heat evolved in the extension and relaxation of rubber, 5139

Ehrenberg, H. F. Isotope analyses of lead from minerals, 6188

Ehrenberg, L. *See* Saeland, E., 8743

Ehrenberg, W. and Franks, A. Small-angle X-ray scattering, 1972

Ehrlich, S. L. Proposal of piezomagnetic nomenclature for magnetostrictive materials, 990

Eicher, J. H. *See* Myerson, A. L., 3016

Eichholz, G. G. The Rosenblum spark counter, 1701. Activation assaying for tantulum ores, 2645. The half-life of W^{187}, 3546

Eichholz, G. G., Hilborn, J. W. and McMahon, C. The determination of uranium and thorium in ores, 5187

Eicke, H. *See* Schulze, A., 6769

Eigen, M. Theory of thermal conductivity of water, 4051. *See also* Wicke, E., 4641, 6286

Einbinder, H. The hydrodynamic stability of flame fronts, 3248

Einstein, A. A comment on a criticism of unified field theory, 2166

Eirich, F. R. *See* Frisch, H. L., 3697

Eisberg, R. M. *See* Igo, G. J., 3388

Eisenberg, M. *See* Tobias, C. W., 7242

Eisenberg, Y. *See* Barrett, P. H., 1731, 2883

Eisenbud, M. and Harley, J. H. Radioactive dust from nuclear detonations, 5252

Eisenhart, L. P. Generalized Riemann spaces and general relativity, 8175

Eisenschitz, R. A discussion on theory of liqui Transport processes in liquids, 2239

Eisenstein, A., John, H. and Affleck, J. H. Dou activators in oxide cathode base alloys, 6910

Eisenstein, J. Physical properties of chromium alums low temperatures, 1573

Eisler, J. D. Studies of a surface seismic disturban 4491

Ekelund–Kappeler, B. *See* Benedicks, C., 2772

Ekstein, H. Multiple scattering and radiation dampi II., 2207

El-Bedewi, F. A. *See* Middleton, R., 3586

Elcock, E. W. The flux distribution of a magne dipole with reference to small Barkhausen disco tinuities, 1745

Elder, F. K., Jr and de Haas, N. Experimental stu of the formation of a vortex ring at the open end o cylindrical shock tube, 62

Elder, T. *See also* Benesch, W., 6612

Elder, T. and Strong, J. The infrared transmission atmospheric windows, 7354

Elghozi, G. A problem of radio-goniometry: ion spheric anisotropy, 5595

Elias, P. Optics and communication theory, 3962

Eliot, E. A., Roaf, D. and Shaw, P. F. D. The cro section and angular distribution of the D-D reactic below 50 keV, 3582

Elistratov, A. M. The scattering of X-rays by cryst of an ageing alloy, 1971

Elkina, T. A. *See* Akulov, N. S., 5572

Elkind, M. M. Ion optics in long, high voltage accele tor tubes, 3362

el Komoss, S. G. *See* Nikitine, S., 3505–6

Ellendt, G. and Cruse, K. The determination of t reaction constants for the formation of mercury co plexes by conductivity measurements, 6283

Eller, G. von. *See* von Eller, G.

Ellickson, R. T. Electron trapping states in phospho 3159

Ellinger, J. P. *See* Fischer, R. B., 7983

Elliot, H. *See* Thambyahpillai, T., 7774

Elliot, J. F. *See* Legvold, S., 8554

Elliott, A. Infra-red dichroism in synthetic po peptides, 8752

Elliott, J. F., Legvold, S. and Spedding, F. H. Som magnetic properties of gadolinium metal, 6959

Elliott, J. P. Theoretical studies in nuclear structu V. The matrix elements of non-central forces w an application to the 2*p*-shell, 7032

Elliott, M. W., Cheng, L. S., Haskins, J. R. a Kurbatov, J. D. Nuclear spectroscopy of Ba^{1} 403

Elliott, N. The magnetic properties of some anhydro chlorides, 5565. *See also* Perlman, M., 199 A Slowinski, E., 6953

Elliott, R. J. A theory of the paramagnetism uranyl-like ions, 2532. Crystal field theory in t rare earths, 8562

Elliott, R. J. and Stevens, K. W. H. The theory of t magnetic properties of rare earth salts: cerium eth sulphate, 2545. The theory of magnetic resonan experiments on salts of the rare earths, 6950. T magnetic properties of certain rare-earth ethyl s phates, 7797

Elliott, S. B. *See* Bishop, F. W., 6843

Ellis, G. R. Angle arrival of *Z* echoes, 3771

Ellison, C. H. *See* Bergstrahl, T. A., 6859

Ellison, F. O. and Shull, H. An LCAO MO se consistent field calculation of the ground state H^2O, 8625 olar fl

Ellison, M. A. A photometric survey of s 2151 plages and prominences in H α light and porosit

Ellwood, E. C. Lattice vacancies copper-nickel alloys, 1168 theory of the pho

El-nadi, M. On the de Broglie t 35 1384 V. 90

Elrod, H. *See* Krieger, J. M., 29 nd Cleveland,

El-Sabban, M. Z., Meister, A. G. a carb 1,1-trichloroeth Vibrational assignments for 1 800 753

Elsaesser, M. S. and Wirtz, K. T 70 he angular dep 60 single cloud d ence of the scattering of light by th cosmic ray me lets. (Measured on the tracks of in a Wilson-chamber), 6676 36

Elsässer, H. *See* Siedentopf, H., 58

SCHNER, B. Domain structure near cavities on the surfaces of iron-silicon crystals, 1764. *See also* ECKARDT, A., 6260
SKEN, R. H. *See* SHAW, T. M., 4912
SON, R., BENTLEY, W., GHIORSO, A. and VAN WINKLE, Q. The thermal neutron fission and capture cross section of U^{232}, 2726
SON, R., SELLERS, P. A. and JOHN, E. R. The thermal neutron capture cross sections of Pa^{231} and Pa^{232}, 4367
TON, L. R. B. Elastic scattering of electrons, 8448
TON, L. R. B. and PARKER, K. The scattering of fast positrons by nuclei, 6846
VERUM, G. W., JR. *See also* COLE, L. G., 201
VERUM, G. W., JR and DOESCHER, R. N. Physical properties of liquid fluorine, 1404
VING, P. J. *See* LOVELAND, J. W., 526
-WAHAB KHALIL, M. ABD. *See* ABD EL-WAHAB KHALIL, M., 8496
WERT, G. A generalized ionization formula for plasmas, 3390. *See also* SIEDENTOPF, H., 2908
Y, R. *See* BENDER, R. S., 270
MERSON, W. B. Determination of planeness and bending of optical flats, 2973
MERSON, W. H. *See* RADO, G. T., 959
MERTON, H. W. *See* HATFIELD, P., 2029
MIGH, C. R. and MEGILL, L. R. Semi-empirical equations for the spectral energy distribution in X-ray beams, 4132
MILIANI, C. and EDWARDS, G. Tertiary ocean bottom temperatures, 7346
MRICH, R. J. and CURTIS, C. W. Attenuation in the shock tube, 3042
MSCHWILLER, G. Kinetics of the dissociation of the hydroferrocyanic ion in aqueous solution, 3686
MSLIE, A. G. *See also* KING, G. W., 8311
MSLIE, A. G. and KING, G. W. Spectroscopy from the point of view of the communication theory. II. Line widths, 8310
NATSU, H. The mass relation of heavy particles, 4612
NDT, P. M. *See* DE JONG, D., 3583
NENSHTEĬN, B. S. *See* TIKHONOV, A. N., 7342
NER, C. On the study of the wave field of a vibrating quartz crystal, 4668
NGE, H. A. Combined current integrator and sensitive microammeter, 906
NGE, H. A., BUECHNER, W. W. and SPERDUTO, A. Magnetic analysis of the $Al^{27}(d, p)Al^{28}$ reaction, 1123
NGEL, A. VON. *See* VON ENGEL, A.
NGELDER, T. C. A search for short-lived nuclear isomers, 4307
NGELHARD, E. The present state of a lightwave standard of length, 2970
NGELKEMEIR, D. W. *See also* FREEDMAN, M. S., 1068; WAGNER, F., JR, 2656
NGELKEMEIR, D. W., FIELDS, P. R. and HUIZENGA, J. R. Radiations of Pu^{243}, 4305
NGELL, H.-J. *See* HAUFFE, H., 6285
NGELMANN, F. *See* DÖRR. F., 973
NGLAND, R. D. and OGLE, W. E. A betatron monitor and integrator, 4161
NGLER, H. D. *See* BRIX, P., 1500
NGLER, N. *See* GREEN, A. E. S., 7033
NGLISH, W. N. and HANNA, G. C. Grid ionization chamber measurements of electron drift velocities in gas mixtures, 6902
NGSTRÖM, A. and FINEAN, J. B. Low-angle X-ray diffraction of bone, 4411
NNOS, A. E. The origin of specimen contamination in the electron microscope, 5129
EPELBOIN, I. *See* BOURRAT, J., 2539
EPP, E. R. See JOHNS, H. E., 2870
EPPLING, F. J. *See* JACKSON, H. L., 2688
EPSTEIN, I. and MOTZ, L. On the sun's interior, 3806
EPSTEIN, L. F. Low temperature second virial coefficients for a Lennard–Jones gas, 665. Constants in the equation of state of a gas, 1598*. *See also* ROE, G. M., 664
EPSTEIN, L. I. The design of optical filters, 764
EPSTEIN, P. S. and CARHART, R. R. The absorption of sound in suspensions and emulsions. I. Water fog in air, 5344
EPSTEIN, S. T. The causal interpretation of quantum mechanics, 2178, 7468
ERARD, H. R. *See* MALOOF, S. R., 1981
ERBEN, T. *See* CIVAOĞLU, I., 7246
ERDMANN, K. Contribution on the problem of protective agents against radiation, 6347
ERDMANN, K. and MEYER, I. Further investigations of the protection effect of sodium thioglycolate against radiation injury, 8829
ERDÖS, P., SCHERRER, P. and STOLL, P. Photofission in B^{10} and B^{11} with γ-rays up to 31 MeV, 7136
EREMEEV, M. A. and MATSKEVICH, T. L. The emission of electrons and the reflection of potassium ions from the surface of liquid tin, 6103
EREMEEV, M. A. and SHESTUKHINA, V. V. The emission of electrons and the reflection of potassium ions from tungsten and tantalum, 6100. The emission of electrons and the reflection of lithium ions from tungsten and tantalum, 6101
EREMEEV, M. A. and YUR'EV, V. G. The emission of electrons and the reflection of ions of potassium and lithium from oxidized tungsten and tantalum, 6102
ERGANG, H. *See* GOBRECHT, H., 8029
ERGINSOY, C. Energy states of overlapping impurity carriers in semiconductors, 846
ERICHSEN, L. V. *See* V. ERICHSEN, L.
ERICKSON, R. A. Neutron diffraction studies of antiferromagnetism in manganous fluoride and some isomorphous compounds, 6132
ERIKS, K. *See* GERDING, H., 4033
ERIKSEN, V. O. and HÄLG, W. Xe^{135} poisoning of the JEEP, 7942
ERIKSSON, H. A. S. Space reflection, time reversal and charge conjugation of spinor fields, 4604
ERLANDSSON, G. Measurements on the microwave of methyl alcohol and nitromethane, 1524. Preliminary analysis of the microwave spectrum of formic acid, 6633. Microwave spectrum of fluorobenzene, 6634
ERMOLAEV, V. L. *See* TERENIN, A. N., 6647
ERNSBERGER, F. M. and DREW, C. M. Improvements in design and construction of quartz helix balances, 2979
ERNST, P. J. and ZAYON, P. Some acoustical properties of lead and other substances at liquid nitrogen temperature, 2272
ERRINGTON, R. F. *See* GREEN, D. T., 7117
ERSHOV, V. N. A method of gas analysis based on optical and acoustical phenomena, 2038
ERSKINE, G. A. and SEATON, M. J. The asymptotic solution of an equation occurring in scattering theory, 3880
ERTAUD, A. *See also* BONÉT-MAURY, P., 2105; BOURGEOIS, J., 7962
ERTAUD, A. and ZALESKI, P. Measurement of neutron densities by autoradiography of detectors, 5722
ERWALL, L.-G. *See* COLDING, B., 4432
ESAKI, L. Thermal treatment of silicon rectifiers, 2451. Properties of thermally treated germanium, 3309. Electrical resistivity and thermionic emission of silicon, 6906
ESCOBER, I. V. and HARRIS, F. B., JR. Meson asymmetry at the geomagnetic equator, 6924
ESEL'SON, B. N. and LAZAREV, B. G. New and peculiar properties of film transport in helium II, 5441
ESHBACH, J. R. and STRANDBERG, M. W. P. Apparatus for Zeeman effect measurements on microwave spectra, 729
ESHELBY, J. D. Screw dislocations in thin rods, 3711. The equation of motion of a dislocation, 4479. A tentative theory of metallic whisker growth, 8767
ESMAIL–BEGUI, Z. and NAYLOR, T. K. Measurement of the propagation of sound in Fiberglas, 2304
ESPAGNAT, B. D'. *See* D'ESPAGNAT, B.
ESPERSEN, J. *See* ARLEY, N., 4492
ESSEN, L. Precision measurements with microwaves, 124. The measurement of time, frequency and velocity, 2981. The refractive indices of water vapour, air, oxygen, nitrogen, hydrogen, deuterium and helium, 3455
ESSLINGER, P. *See* SCHUBERT, K., 8097
ESTRABAUD, S. Effects of the solar eclipse of Feb. 25, 1952, on the ionospheric *F*2 region in equatorial Africa, 2844. Influence of the solar eclipse of February 25, 1952, on the ionospheric *E* region in equatorial Africa, 5235

Éstulin, I. V. The influence of the spectrum of γ-radiation on the transition effect of γ-rays, 3571
Etter, L. R. *See* Thompson, R. W., 5720, 7172
Etzel, H. W. Enhancement of the *F*- and *V*-bands in sodium chloride containing calcium, 128. A single detector split-beam automatic recording spectrophotometer, 2322
Etzold, H. Storage technique for sound measurement, 6560
Euler, J. The carbon arc as a radiation standard for spectrophotometry in the wavelength range 0·25 to 1·8 μ, 4693. On the thermal conductivity of artificially graphite rods in the temperature range 3300 to 3700° K, 5996. On McPherson's graphite normal arc, 6816
Euler, J. and Zickwolff, G. Photoelectric contrast measurements on photographic objectives, 6349*
Euranto, E. K. *See* Laurikainen, K. V., 7450
Evans, D. F. and Richards, R. E. The preparation and magnetic susceptibility of clathrate compounds of nitric oxide and of oxygen, 3438
Evans, D. M. and Wilman, H. Crystal growth and orientation in deposits condensed from the vapour, 7198
Evans, G. E. Materials, 8153. *See also* Barnett, C. F., 6104
Evans, G. E., Stier, P. M. and Barnett, C. F. The stopping of heavy ions in gases, 6099
Evans, H. T., Jr. Use of a Geiger counter for the measurement of X-ray intensities from small single crystals, 3738. *See also* Christ, C. L., 7333
Evans, M. W. Current theoretical concepts of steady-state flame propagation, 6719
Evans, R. T. *See* Ludeke, C. A., 3450
Evans, U. R. Chemical behaviour as influenced by surface conditions, 4400
Evans, W. H. *See also* Crewe, A. V., 286
Evans, W. H., Green, T. S. and Middleton, R. An investigation of the reaction $^{14}N(d, n)^{15}O$ at 8 MeV deuteron energy, 3587
Evans, W. H. and Wagman, D. D. Thermodynamics of some simple sulfur-containing molecules, 3276
Everett, D. H. The dissociation constants of ethylene diammonium and hexamethylene diammonium ions from 0° to 60°c, 2782
Everett, D. H., Landsman, D. A. and Pinsent, B. R. W. The thermodynamics of ionization of some fatty acids, 2781
Eversheim, P. and Kleber, W. Morphology and structure of reddingite, $P_2O_5 . 3FeO . 3H_2O$, 3745
Evett, A. A. and Margenau, H. The forces between hydrogen molecules, 6160
Evstrop'ev, K. S. *See* Gutkin, N. G., 6034
Ewald, H. A graphical representation of the energy valley surface based on the more recent isotope mass determinations, 4958
Ewald, P. P. International tables for X-ray crystallography, 7299
Ewan, G. T. and Ross, M. A. S., γ-Rays of radium-D, 1081
Ewers, W. E. and Sutherland, K. L. The rôle of surface transport in the stability and breakdown of foams, 1418
Ewles, J. and Heap, C. N. Luminescence and adsorption phenomena in some oxides and halides, 4721
Extermann, R.-C. *See* Béné, G.-J., 4900, 5563, 7786
Eyfrig, R. A lunar influence on the height of the centre of the *F*2 layer, 1282
Eyring, H. *See also* Barker, R. S., 5623; Prager, S., 7494
Eyring, H. and Wallenstein, M. A kinetic treatment of saturation and condensation statistics, 5306

Fabelinskiĭ, I. L. *See* Motulevich, G. P., 5425
Faber, T. E. The phase transition in superconductors. II. Phase propagation above the critical field, 6806
Fabre de la Ripelle, M. *See* de la Ripelle, M. Fabre
Facchini, U. *See* Bracci, A., 5035, 8662; Colli, L., 417–18, 4876, 8466
Facy, L. Bursting of thin films and condensation nuclei, 7355*
Fadigati, E. *See* Danusso, F., 4665
Faelens, P. The mechanism of desensitization caus
by pressure on photographic emulsions, 6355
Fagg, L. W. and Hanna, S. S. Polarization of t
O^{16} gamma-rays, 1895
Fagot, W. C. *See* Simpson, J. A., 6923
Fahrenfort, J. *See* Couture–Mathieu, L., 129, 471
Fainberg, J. *See* Schein, M., 7909
Fainberg, V. Ya. On the cascade curve in heavy el
ments, 5554
Fairbairn, H. W. *See* Hurley, P. M., 2828
Fairbank, H. A. *See* Detwiler, D. P., 865; King, J.
6729
Fairbanks, G. *See* House, A. S., 2299
Fairbrother, J. A. V. Ratio of convection to condu
tion loss from a hot wire stretched along the axis of
vertical cylindrical tube, 6702
Fairweather, A. and Frost, E. J. Dielectric behavio
of granular semi-conducting aggregates, with speci
reference to some magnesium ferrites, 4080, 7661
Falk, C. E. *See also* Hafner, E. M., 1923
Falk, C. E. and Poss, H. L. Liquid scintillation counte
279
Falk, G. The structure of the domains of magnitu
[Grössenbereich] of classical and quantum mechani
8211
Falk, M. Some applications of gamma-radiograph
techniques, 2127
Falkenhagen, H. and Kelbg, G. Classical statistics
the consideration of the space requirements
particles, 2244. Voltage dependence of the electric
conductivity of strong non-associating electrolyt
with consideration of the space requirements of th
ions, 5752. Influence of ionic size and electron she
number on the theory of strong electrolytes, 8737
Falkenhagen, H., Leist, M. and Kelbg, G. Theory
conductivity of strong non-associated electrolytes
high concentrations, 2785
Falk-Vairant, P. Study of conversion electrons fro
$^{231}_{91}Pa$, 1093. *See also* Bouissières, G., 7102; Victo
C., 1897
Falk-Vairant, P. and Riou, M. Study of the γ-ray
accompanying the transmutation $^{231}_{91}Pa \xrightarrow{\alpha} {}^{227}_{89}A$
5691
Falk-Vairant, P. and Teillac, J. Calculation of th
intensity of fine structure lines of some even-eve
α-emitters, 5681
Falla, L. *See* Hautot, A., 2121
Faltings, V. The measurement of natural C^{14} activitie
in the proportional counter, 1048
Fan, H. Y. *See* Navon, D., 849; Taylor, W. E., 845
Fanguin, R. *See* Raoult, G., 6152
Fankuchen, I. *See also* Brous, J., 8106; Holtzber
F., 2836; Ladell, J., 7327
Fano, U. Geometrical characterization of nuclea
states and the theory of angular correlations, 4961
Fant, C. G. M. *See* Stevens, K. N., 5934
Fantappiè L. Analytical characterization of [physica
quantities in quantum mechanics, 1369. Determina
tion of all the physical quantities possible in
quantized universe, 2941
Faraggi, H. Non-observation of the reaction Fe(n, α
Cr under the action of thermal neutrons, 5708
Faraggi, H., Bernas, R. and Bonnet, A. On (n, d
reactions produced by slow neutrons on separate
zinc isotopes, as well as on nickel, 452
Faraggi, H., Bonnet, A. and Cohen, J. Irradiatio
and development of nuclear emulsions exposed to
high flux of thermal neutrons accompanied b
gamma radiation, 2131
Faraggi, H., Kohn, A. and Doumerc, J. On a
autoradiographic technique by neutron irradiatio
for revealing the boron constituent in boron steels
2129
Faran, J. J., Jr. Scattering of cylindrical waves by
cylinder, 2283
Farber, M. *See also* Altman, D., 6717
Farber, M. and Darnell, A. J. The dissociation of H
and N_2 on tungsten filaments, 2779
Faris, J. J. Note on toric wave fronts, 5938
Fark, H. Thermal and haemolysis effects of ultrasound
1467. Intensity measurement of ultrasound, 1468
Detection of β- and γ-rays with counter tubes, 5534
Farmer, E. C. *See* Berstein, I. A., 8027
Farmer, F. T. *See* Fowler, J. F., 8398
Farmer, M. H. *See also* McLean, D., 8275

rmer, M. H. and Glaysher, G. H. The experimental production of small tensile specimens by electrolytic solution (electro-turning), 3667

rnell, C. C. *See* Loening, E. E., 2874

rquhar, R. M. *See* Collins, C. B., 2093, 3765

ssel, V. A. *See* Huke, F. B., 4724

st, J. D. and Meijering, J. L. Anelastic effects in iron containing vanadium and nitrogen, 5123

stov, N. S. Heat emanation during the process of plastic deformation, 5737. Allowance for temperature in the equations of plasticity theory, 7213. The effect of plastic deformation on diffusion, 7970

ulkner, E. A. *See* Croft, A. J., 4105

uquet, A. *See* Martinot-Lagarde, A., 1437

uss, R. *See* Scheibe, G., 4024

ust, W. R. *See* Scherrer, V. E., 4365, 8687

va, A. *See* May, S., 3677

vre, R. and Haenny, C. The construction of Maze type [Geiger] counters and their characteristics between 0° and 50°c, 6883

x, B. J. *See* Corrsin, L., 6621

y, R. D. Notes on the transmission of sound through plates, 3044. Effect of losses on transmittivity of plates, 5922

yolle, P. The measurement of small intervals of time, 6506

zzini, T. *See* Della Corte, M., 3383

ather, N. Nuclear stability rules, 4270. A survey of neutron and proton binding energies, 4960. The Sargent diagram for *K*-electron capture, 5013. A new parameter for use in discussions of the shell model of the nucleus, 5651

azel, C. E. *See* Bullock, B. W., 739

chter, H. R. *See* Hofstadter, R., 7722

derov, F. I. Determination of the optical parameters of uniaxial crystals by reflected light, 5380

dorov, V. N. *See* Shul'man, A. R., 5995

doruk, S. O. *See* Johns, H. E., 2870

enberg, E. *See* Davidson, J. P., 2620

ehr, E. B., Friedman, A. I., Studer, F. J. and Fonda, G. R. The multiple emission bands in zinc cadmium sulfide phosphors, 1553

ehr, R. O. Unsolved problems in the field of aircraft noise, 718

ein, A. E. and Smith, C. S. The polarization of acoustic waves in cubic crystals, 691

eingold, A. M. The ground state of N^{14}, 2610

einstein, J. On the nature of the decay of a meteor trail, 582. The limiting polarization of magneto-ionic waves, 3462. Gradient reflections from the atmosphere, 5593

eld, B. T. The angular and energy distributions in photomeson production, 2713. High-energy nuclear physics, 4337

eldman, C. On the protection of thin films of molybdenum by a layer of vacuum-evaporated SiO, 1177

eldman, C. and Vodar, B. The electrical conductivity of thin films of Pt covered with an evaporated dielectric layer, 218

eldman, D. Meson-nucleon scattering and the classical strong-coupling theory, 628. The charge independence of nuclear forces, 3876. *See also* Goldfarb, L. J. B., 913

eldman, H. G. *See* Dunitz, J. D., 1018

eldman, M. H., Goeddel, W. V., Dienes, G. J. and Gossen, W. Studies of self-diffusion in graphite using C-14 tracer, 1170

Feldtkeller, R. Change of shape of the hysteresis loop of transformer sheet steel during magnetic creep, 6143

Feldtkeller, R. and Kolb, O. The complex permeability of a ferrite core of high permeability, 6144

Feldtkeller, R. and Sorger, G. Magnetic aftereffects of the initial permeability and of the Barkhausen jumps, 4916

Fellgett, P. Concerning photographic grain, signal-to-noise ratio and information, 4544

Fellgett, P. B. *See* Brown, D. A. H., 6733

Fénéant, S. The Raman spectra of solutions of acetic acid in water, 2375

Fenwick, M. *See* Keller, G., 8643

Fényes, I. Contributions to the axiomatic foundation of thermodynamics. I. An axiomatic interpretation of the idea "intensity parameter," 4775. Stochastic dependence character of Heisenberg's uncertainty tion, 5867

Fenyves, E. and Haiman, O. Measurements of the cosmic radiation underground, 2521

Feofilov, P. P. *See* Tolstoĭ, N. A., 6648

Ferguson, A. T. G. *See* Lewis, G. M., 7902

Ferguson, E. Normal coordinate analysis of the non-planar vibrations of 1,3,5-trifluorobenzene, 5634

Ferguson, K. R. Remote control engineering. Design and construction of shielding windows, 2637

Ferguson, T. B. *See* Gilford, S. R., 8821

Ferigle, S. M. *See also* Weber, A., 203

Ferigle, S. M., Cleveland, F. F. and Meister, A. G. Raman and infrared spectral data and assignments for dimethyldiacetylene, 1525

Ferigle, S. M. and Meister, A. G. Selection rules for vibrational spectra of linear molecules, 354

Ferigle, S. M. and Weber, A. Thermodynamic properties of diacetylene, 196. The Eckart conditions for a polyatomic molecule, 2594. Normal coordinate treatment of diacetylene, 4250

Fermi, E. Experimental production of a divergent chain reaction, 1143. Nucleon polarization in pion proton scattering, 7957. *See also* Anderson, H. L., 7176

Fernández, C. Graef. *See* Graef Fernández, C.

Ferrand, L. Characteristics of electrolytes given by small amounts of alumina dissolved in fused cryolite, 509

Ferrari, F. *See also* Clementel, E., 7759

Ferrari, F. and Villi, C. On the evaporative theory of nuclear disintegrations, 1860. The energy levels of heavy nuclei, 7831

Ferraro, V. C. A. The aurorae, 8817

Ferrero, M. and Sacerdote, G. G. Measurement of acoustic impedance by a resonance method, 6573

Ferretti, B. On isobaric states of nucleons and the scattering of π-mesons by protons, 4378

Ferrié, F., Eddi, R., Banerjea, S. K. and Manson, N. The use of a microscope with large working distance in the study of atomizing jets, 7619

Ferris, H. G. The effects of viscous dissipation in the spherical acoustic resonator, 2270*

Ferroni, S. Relation between even and odd couplings in beta-decay theory, 8661. *See also* Brovetto, P., 8557

Ferry, J. D. *See also* Fitzgerald, E. R., 7207; Grandine, L. D., Jr, 5876

Ferry, J. D., Grandine, L. D., Jr and Fitzgerald, E. R. The relaxation distribution function of polyisobutylene in the transition from rubber-like to glasslike behavior, 7208

Fert, C. Paraxial electron trajectories in electrostatic lenses, 892

Fert, C. and Dargent, R. A high resolution replica technique, 3639

Fert, C. and Saporté, R. Electron microscopy by reflection, 2487

Fesenko, E. G. The domain structure of lead titanate, 8761. *See also* Belyaev, I. N., 4788

Fesenkov, V. G. and Rozhkovskiĭ, D. A. The origin of the stars, 5270

Feshbach, H. The Coulomb scattering of relativistic electrons and positrons by nuclei, 264. *See also* Lax, M., 1146; Pease, R. L., 1029

Feshbach, H., Porter, C. E. and Weisskopf, V. F. The formation of a compound nucleus in neutron reactions, 5081

Feshbach, H. and Rubinow, S. I. A variational principle for scattering, 627

Fessler, H. and Rose, R. T. Photoelastic determination of stresses in a cylindrical shell, 4625

Fessler, R. *See* Fischer, E., 4787

Feuer, P. Electronic states in crystals under large over-all perturbations, 534

Few, A. V., Smith, J. W. and Witten, L. B. Accurate measurement of the dielectric constants of solutions, 4790

Feynman, R. P. The λ-transition in liquid helium, 6724

Feyten, J. *See* Mund, W., 5182

Fialho, G. E. A. On the low energy mu-meson from pi-meson decay, 2738

Fialho, G. E. A., and Tiomno, J. Gamma radiation emitted in the pi-mu decay, 2737

Fickett, W. and Wood, W. W. Tables of the Lennard–Jones and Devonshire equation of state at high temperatures and densities, 200

Field, F. H. The dissociation of cyclopropane under electron impact, 999. *See also* Franklin, J. L., 3492

Field, R. F. and Soderman, R. A. Instrumentation and measurements, 828

Fields, P. R. *See* Engelkemeir, D. W. 4305

Fields, R. E. *See* Walt, M., 4366

Fierz, M. Note on the polarization of the protons and neutrons arising from the D–D reaction, 7133

Figuet, J. *See* Crozet, A., 7589

Fillet, P., Niclause, M. and Letort, M. Kinetic study and mechanism of the photo-oxidation of liquid acetaldehyde, 5743

Filosofo, I. *See* Beretta, E., 1712; Brini, D., 1715

Findlay, J. C. *See* Atkins, K. R., 6007

Findlay, V. R. *See* Bruce, C. F., 8344

Findley, D. E. *See* Worthington, H. R., 6096

Fine, H. Some notes on theory of radio scattering in a randomly inhomogeneous atmosphere, 4230

Fine, M. E. Elasticity and thermal expansion of germanium between -195 and 275°c, 3235. $C_p - C_v$ in silicon and germanium, 7641. Magnetomechanical effects in an antiferromagnet, CoO, 8569

Finean, J. B. A versatile X-ray camera for low-angle diffraction studies, 4482. *See also* Engström, A., 4411

Fink, R. W. and Wiig, E. O. Radiations of neutron-deficient barium and cesium nuclides, 7869

Finkelstein, N. A. The measurement of wavelength in echelle spectra, 2323

Finkelstein, R. and Mencher, A. Interatomic electric quadrupole-quadrupole coupling in salts of cerium, 3502

Finkelstein, R. J. The *V*-particle and the composite pion, 1151

Finlayson, D. M. *See also* Barkla, H. M., 4073

Finlayson, D. M., Johnson, V. A. and Shipley, F. M. Interpretation of the low temperature Hall curve of a degenerate germanium sample, 227

Finn, R. K. Determination of the drag on a cylinder at low Reynolds numbers, 5901

Finsen, W. S. The significance of atmospheric dispersion in astronomical interferometry, 2905

Finzi, B. On the principle of least action and on the electromagnetic equations which may be deduced from it. I–II, 2175. On an extension of electromagnetic fields, 2966

Fiora, M. The indirect measurement of certain physical quantities by means of mechanical multipliers, 7412

Fiora, V. C. *See* Turner, T. E., 4016

Fiorentini, A. and Di Francia, G. Toraldo. A high-precision method for measuring the distortion of photographic objectives, 3088

Fireman, E. L. Measurement of the (n,H^3) cross-section in nitrogen and its relationship to the tritium production in the atmosphere, 7935

Firth, K. and Chick, D. R. The "screening" of neutral particles in high voltage ion accelerator tubes, 4864

Fischer, D. Focusing properties of a combination of a magnetic field decreasing with the radius and a cylindrical electric field, 4867. A mass spectrometer with double directional focusing and velocity focusing, 4868

Fischer, E. Dielectric relaxation time and association. I. Principle of the method of investigation exemplified by the cases of a non-associated and an associated dipole liquid (chlorobenzene, phenol), 4786

Fischer, E. and Fessler, R. Dielectric relaxation time and association. II. Solutions and mixtures of weakly associated dipole liquids, 4787

Fischer, H. Self-reversal of the $H\alpha$ hydrogen line in the high pressure spark discharge, 4700

Fischer, I. Z. *See* Fisher, I. Z.

Fischer, K. *See* Andress, K. R., 8109

Fischer, P. and Kochendörfer, A. The formation of displacements, 3715

Fischer, R. B. and Ellinger, J. P. A replica technique in the study of chemical precipitation processes, 7983

Fischer–Jørgensen, E. The phonetic basis for identification of phonemic elements, 709*

Fisher, D. Crystal structures of gutta percha, 3746

Fisher, I. Z. Characteristics of the fluctuations of the particle numbers in a system with Coulomb interaction, 634

Fisher, L. H. *See* Kachickas, G. A., 869, 7694

Fisher, R. Dispersion on a sphere, 5229

Fite, W. L. Production of negative ions and noise negative ion beams, 2509

Fitzgerald, D. *See* Bronowski, J., 3654

Fitzgerald, E. R. *See also* Ferry, J. D. 7208

Fitzgerald, E. R., Grandine, L. D., Jr and Ferry, J. Dynamic mechanical properties of polyisobutylen 7207

Fitz Osborne, F. J. A simplified ionization gaug circuit, 1430. A simple activation for BeCu mult pliers, 6849

Flammer, C. Variational methods for periodic lattic and artificial dielectrics, 4940

Flammersfeld, A. 188 Re^m, a new nuclear isomer half-life 18·7 min, 6198. ^{68}Cu, a new copper isotop with $\frac{1}{2}$-life 32 sec., 7064

Flammersfeld, A. and Herr, W. ^{55}Cr, a new chromiu isotope with a half-life of 3·52 min, 2654

Fleischmann, R. and Kollath, R. A method measuring the charge of fast moving electrons, 674

Fleming, E. H., Jr, Ghiorso, A. and Cunningham, B. The specific alpha-activities and half-lives of U^{23} U^{235}, and U^{236}, 1059

Fleming, W. H. and Thode, H. G. Argon 38 in pitc blende minerals and nuclear processes in natur 6193

Fletcher, N. H. *See* Somerville, J. M., 2472

Fletcher, R. C. *See* Briggs, H. B., 130; Brown, W. L 6272

Flindt, H. G. *See* Hauffe, K., 848

Flinn, P. A. *See* Rudman, P. S., 5731

Flint, H. T. and Williamson, E. M. Coordina operators and fundamental lengths, 4603. T relation of quantum theory to the theory of gravita tion and electromagnetism and an application the theory of the electron, 7424

Florent, R. and Leach, S. Contribution to the stud of the emission spectra of ammonia and of heav ammonia: the transition $^1\Pi$–$^1\Delta$ of the radicals N and ND, 734

Florentin, J. J. *See* Tebble, R. S., 1759

Florian, A. On the production of mesons in the passag [of photons] through matter, 7165

Florinskaya, V. A. Reflection spectra of ordinary an embrittled lead glasses in the infrared range, 7604

Florinskaya, V. A. and Pechenkina, R. S. Th transmission spectrum of thin silicate-glass films i the infrared region, 6645

Flörke, O. W. The high-temperature form of calciu strontium and barium sulphate, 6319

Flory, L. E. *See* Zworykin, V. K., 787

Flory, P. J. Molecular configuration of polyelectrolyte 3484

Flory, P. J., Krigbaum, W. R. and Shultz, W. B. Th dependence of the intrinsic viscosity of sodiu polyacrylate on salt concentration, 2986

Flottorp, G. Effect of different types of electrodes i electrophonic hearing, 4533

Flowers, B. H. Magnetic moments and quadrupol moments of odd mass nuclei in *jj*-coupling, 1842 Studies in *jj*-coupling. IV. The $g_{\frac{9}{2}}$-shell, 2609 Excited states of nuclei in *jj*-coupling, 4274. *Se also* Batchelor, R., 5537; Edmonds, A. R., 1833

Floyd, J. J. *See* Kunstadter, J. W. 7937

Floyd, K. L. Second-order transition points in hig polymers, 1576

Flügge, S. On the numerical and graphical integratio of oscillation equations, 1328

Foerster, H. Von. *See* Von Foerster, H.

Foëx, G. Magnetic properties and electron distributio in some alloys and compounds, 7791

Foëx, M. *See also* Trombe, F., 184, 7624

Foëx, M., Goldsztaub, S., Wey, R., Jaffray, J Lyand, R. and Wucher, J. Study of the develop ment of some properties of vanadium oxide in th neighbourhood of its transformation temperature 6951

Fogg, P. G. T., Hanks, P. A. and Lambert, J. D Ultrasonic dispersion in halo-methane vapour 8289

Foix, A. On the most simple solution, in polar co ordinates of Maxwell's equations, and their appli cation to formulae for vitreous refraction in lense and on Huyghen's principle, 724

kker, A. D. The tracks of tops' pegs on the floor, 2216
kker, A. D., Jr. Some notes on the fountain model of cometary envelopes and streamers, 6404
ldy, L. L. A new rigorous lower bound on the range of the triplet neutron-proton interaction, 4393. *See also* Kroll, N. M., 612
ley, H. M. *See* Frosch, R.A., 1814
lkierski, A. The mass difference of sulphur 32 and chlorine 35, 2631
ll, J. Le. *See* Le Foll, J.
mina, M. A. *See* Kapustin, A. P., 5766
nda, G. R. *See* Fehr, E. B., 1553
ner, S. The Hall effect in nickel ferrite, 988
ner, S. and Pugh, E. M. Hall effects of the cobalt nickel alloys and of Armco iron, 6977
ner, S. N. and Hudson, R. L. The detection of atoms and free radicals in flames by mass spectrometric techniques, 7629
ng, P. Asymmetric fission, 2727
nger, W. *See* Simpson, J. A., 6126
nger, W. H. Cosmic radiation intensity-time variations and their origin. II. Energy dependence of 27-day variations, 6925
ote, P. D. Optics in the oil industry, 1320
rbes, S. G. Activation cross-sections for 14-MeV neutrons, 1920*
rbes, S. G., Graves, E. R. and Little, R. N. Low voltage 14-MeV neutron source, 6242
rd, K. W. The first excited states of even-even nuclei, 4275
restier, H. *See* Stahl, P., 7966
rneris, R. *See* Stammreich, H., 3164, 5975
rrer, R. Effective magnetic distances in ferromagnetic and antiferromagnetic metals, alloys and compounds of the iron group, 957
rrez, G. *See* Van Itterbeek, A., 8270
rsthoff, C. W., Goeckermann, R. H. and Naumann, R. A. Formation and decay of Mo^{93m}, 7074
rsyth, P. A., Currie, B. W. and Vawter, F. E. Scattering of 56 Mc/s radio waves from the lower ionosphere, 4231
rsyth, P. J. E. Exudation of material from slip bands at the surface of fatigued crystals of an aluminium-copper alloy, 3668
rtescue, R. L. *See* Clifford, D. S., 248
rtier, A. and Kravtchenko, J. Some properties of solutions of Navier's equations, 5320
rtrat, M. R. On solid lubrication, 8728
rty, A. J. The growth of crystals of the hexagonal metals from their vapours, 1246
rty, A. J. and Frank, F. C. Growth and slip patterns on the surfaces of crystals of silver, 5196
oster, B. P. *See* May, J. E., 4324
oster, E. W. and Richardson, O. The fine structure of the $4d^3\Sigma$, $^3\Pi_{cd}{}^3\Delta_d \rightarrow 2p^3\Pi_{cd}$ transitions of the H_2 spectrum, 6610
oster, J. S. *See also* Johnson, F. A., 5045
oster, J. S., Jr. *See also* Gow, J. D., 8463
oster, J. S., Jr, Lawrence, E. O. and Lofgren, E. J. A high vacuum high speed ion pump, 5898
oster, R. and Hammick, D. L. Emission of molecular complexes of nitro-compounds, 1506
otheringham, D. *See* Allen, K. R., 7371
ourie, D. J. The photoelectric effect of thin Bi films, 7681
ournet, G. The study of order-disorder changes in Cu-Pt alloys, 3718. The study of order-disorder changes. III. Short range order in the alloy AuCu$_3$, 7294. A study of Vegard's law, 7814. The existence of short range order in solid solutions. A study of aluminium silver alloys, 8102
ournet, G. and Antzenberger, P. Study and interpretation of low-angle X-ray scattering by cellulose, 5729
owkes, F. M. and Sawyer, W. M. Contact angles and boundary energies of a low energy solid, 63
owler, C. M. *See* Kruse, H. W., 7721
owler, E. C., Fowler, W. B., Shutt, R. P., Thorndike, A. M. and Whittemore, W. L. A diffusion cloud chamber study of pion interactions in hydrogen and helium, 7175
owler, F. E., Johnson, D. S. and Billings, D. E. An isophotal contour densitometer, 2309
Fowler, G. N. and Jones, G. M. D. B. On the ionization loss of a fast particle in a dielectric medium, 6896
Fowler, J. F. and Farmer, F. T. Effect of temperature on the conductivity induced in insulators by X-rays, 8398
Fowler, J. L. *See also* Brolley, J. E., Jr, 1134
Fowler, J. L., Jones, W. H. and Paehler, J. H. Fission asymmetry as a function of excitation energy of the compound nucleus, 435
Fowler, R. G., Atkinson, W. R., Compton, W. D. and Lee, R. J. Shock waves in low pressure spark discharges, 251
Fowler, W. A. *See* Kraus, A. A., Jr, 1907. Warters, W. D., 7919.
Fowler, W. B. *See also* Fowler, E. C., 7175
Fowler, W. B., Shutt, R. P., Thorndike, A. M. and Whittemore, W. L. Observation of V^0 particles produced at the cosmotron, 7171. Examples of multiple pion production in n–p collisions observed at the cosmotron, 8688.
Fox, A. G. *See* Weiss, M. T., 339
Fox, F. E. *See also* Connolly, P. L., 5919
Fox, F. E. and Marion, T. M. Ultrasonic dispersion in water solutions of magnesium sulfate, 5914
Fox, H. W. and Zisman, W. A. The spreading of liquids on low-energy surfaces. III. Hydrocarbon surfaces, 7491
Fox, J. G. *See* Mott, W. E., 6095
Fox, L. L., Packham, R. C. G., Palmer, P. L. and Whittaker, D. Sampling errors in radiation measurement using the Moll thermopile method, 8380
Fox, M. *See* Alexander, F., 2117
Fox, R. E., Hickam, W. M., and Kjeldaas, T., Jr. Ionization probability curves for krypton and xenon near threshold, 2510
Fox, T. G. and Mandelkern, L. Dilute solution hydrodynamic behavior of flexible chain molecules: polymethyl methacrylate, 3005
Fradkov, A. B. *See* Malkov, M. P., 6011
Fraenkel, G. K. Dielectric constants of solutions of charged particles, 1610
Fragstein, C. v. *See* v. Fragstein, C.
Franchetti, S. Cloud chamber study of cosmic ray electronic showers under dense materials. I, 8491. *See also* Della Corte, M. 3383
Francia, G. Toraldo di. *See* Di Francia, G. Toraldo
Francis, A. E., McCue, J. J. G. and Goodman, C. Inelastic scattering of neutrons by Cd^{111}, 4363
Francis, G. and von Engel, A. The growth of the high frequency electrodeless discharge, 6822
Francis, N. C. Photoproduction of π^0 mesons in hydrogen and deuterium, 2715
Francis, N. C. and Watson, K. M. Relation between the photoproduction and scattering cross sections for π-mesons in complex nuclei, 2711
Franck, E. U. Thermal conductivity in mixtures of chemically reacting gases, 5997
Franck, E. U. and Stöber, W. Viscosity and molecular effective diameter of fluorine, 3017
François, H. *See* Lumbroso, N., 7798
Françon, M. Interference by double refraction with white light. New methods for the observation of transparent objects, 780. Comparative theoretical study of phase-contrast and interference methods, 3202. Interference microscope using a plate of spar cut perpendicular to the axis, 6686. Interferometry by polarization in reflected light, 8351.
Françon, M. [Ed.]. Phase contrast and contrast by interference, 3199
Françon, M. and Nomarski, G. Phase plates by reflection, 3213
Françon, M. and Saez, A. The resolving power of the phase-contrast microscope, 3206
Frank, E. Electric potential produced by two point current sources in a homogeneous conducting sphere, 825
Frank, F. C. A discussion on theory of liquids: supercooling of liquids, 2241. On tin whiskers, 8050. *See also* Forty, A. J., 5196
Frank, F. C. and Stroh, A. N. On the theory of kinking, 533
Frank, H. Investigation of the Brown effect in hexagonal selenium crystals, 2459

FRANK, R. M. and YUDOWITCH, K. L. Small angle X-ray scattering from compact identical particles, 881
FRANK, V. and JEPPESEN, O. G. The Hall coefficient of calcium, 4235
FRANKEN, B., VAN ITTERBEEK, A., VAN DEN BERG, G. J. and LOCKHORST, D. A. Influence of a magnetic field on the electrical resistance of iron films, 3318
FRANKEN, P. and KOENIG, S. A determination of $g_J(^2S_{\frac{1}{2}})$ of potassium in terms of the proton gyromagnetic ratio, 388
FRANKENBERGER, E. A necessary condition for development of convection in the atmospheric frictional layer near the surface, 6329
FRANKL, D. R. and READ, T. A. Effects of *F*-centers on the internal friction of rocksalt single crystals, 3725
FRANKL', F. I. On gravitational waves and on the motion of gases in strong varying gravitational fields, 5287
FRANKLIN, A. D. and BERKOWITZ, A. E. The approach to saturation in dilute ferromagnetics, 4215
FRANKLIN, A. D., CAMPBELL, R. and WEINMAN, J. Measurement of particle size of fine ferromagnetic powders, 7974
FRANKLIN, J. L. and FIELD, F. H. The energies of strained carbonium ions, 3492
FRANKS, A. *See* EHRENBERG, W., 1972
FRANSON, K. D. *See* BROWN, C., 5318
FRANZ, W. Internal field emission from localized defects in insulating crystals, 2478
FRASER, J. S. The angular distribution of prompt neutrons emitted in fission, 1140
FRASER, R. D. B. Infra-red dichroism of tobacco mosaic virus nucleoprotein, 126
FRASER, R. D. B. and PRICE, W. C. Infra-red dichroism and protein structure, 126
FRAU, D. C. The poles of the *S*-matrix of an interference filter, 6671
FRAUENFELDER, H. *See* LAWSON, J. S., JR, 7858
FRAZER, B. C. and PEPINSKY, R. X-ray analysis of the ferroelectric transition in KH_2PO_4, 6756
FRECH, M. F. *See* WISE, H., 1212, 5157, 7234
FRED, M. *See also* CONWAY, J. G., 3990
FRED, M. and TOMKINS, F. S. Nuclear spin of $_{95}Am^{241}$, 2616
FREEDMAN, A. J. and ANDERSON, E. C. Low-level counting techniques, 285
FREEDMAN, H. P. *See* AHLERS, N. H. E., 8312
FREEDMAN, M. S. Proposal for a lens type pair spectrometer, 1899. *See also* WAGNER, F., JR, 2656
FREEDMAN, M. S., JAFFEY, A. H., WAGNER, F., JR and MAY, J. The radiations of Th^{231} (UY), 1881
FREEDMAN, M. S., WAGNER, F., JR and ENGELKEMEIR, D. W. The beta-spectra of Pu^{239}, Pu^{240}, and Pu^{241}, 1068
FREELY, J. *See* DOBISCHEK, D., 7725; JACOBS, H., 904
FREEMAN, B. E. and MCHALE, J. L. Barrier penetration effects for light nuclei, 1903
FREEMAN, J. J. On the relation between the conductance and the noise power spectrum of certain electronic steams, 288
FREEMAN, J. M. *See* ROSE, B., 4362
FREEMAN, N. K. *See* BOHN, C. R., 4018
FREIER, G. D. *See* BROWN, R. J. S., 272; STRATTON, T. F., 440; STRATTON, W. R., 438
FREITAG, F. On the simultaneous fine-correction of the aberrations in optical systems, 5374
FREIWALD, H. and UDE, H. On spherical explosion waves in mixtures of acetylene and air, 7236
FREMLIN, J. H. Artificial activity induced in carbon by fast ^{3}He ions, 431. Helium 3 reactions in nuclear photographic emulsions, 4342. *See also* CHACKETT, K. F., 8673; WALKER, D., 3361
FREMLIN, J. H. and WALTERS, M. C. An experimental investigation of the stability of nuclei against double beta-disintegration, 1882
FRENCH, A. P. *See* KRAUS, A. A., JR, 1907; SEED, J., 1110, 3576
FRENCH, J. B. *See also* DAITCH, P. B., 441
FRENCH, J. B. and GOLDBERGER, M. L. The Coulomb scattering of deuterium, 437
FRENCH, J. B. and SHIMAMOTO, Y. Theory of multipole radiation, 7896
FRENKEL', YA. I. Theory of reversible and irreversible cracks in solids, 6244
FRENKIEL, F. N. The comparison between the lon
tudinal correlation and the time correlation in turbulent flow, 1431
FRENKIEL, F. N. and SCHWARZSCHILD, M. Prelimin
analysis of the turbulence spectrum of the so
photosphere at long wave lengths, 3808
FRESCO, J., JETTER, E. and HARLEY, J. Radiome
properties of the thorium series, 393
FRETTER, W. B., MAY, M. M. and NAKADA, M. P.
study of neutral *V* particles, 1944
FREUDENTHAL, A. M. and GUMBEL, E. J. On
statistical interpretation of fatigue tests, 4425
FREUND, T., ADLER, S. and SPARROW, C. A prelimin
magnetic study of purple sulfur, 3433
FREY, J. *See* KORNETZKI, M., 6130
FREYMANN, M. and FREYMANN, R. On the existence
two distinct causes of Debye absorption in Hertz
spectra. Application to semiconductors, 749. T
new method of studying lattice defects in solids
Debye absorption: case of semiconductors, 16
New method for the study, by high frequency spect
scopy, of defects in the structure of the semico
ductor ZnO, 1640. Hertzian spectrum and
structure of solids. I. Debye absorption of sol
in the Hertzian spectrum and lattice defects, 56
Lattice defects in solids and Hertzian spectra: nec
sity of distinguishing ionic Debye absorption a
electronic Debye absorption, 6760
FREYMANN, R. *See also* FREYMANN, M., 749, 1623, 16
5606, 6760
FREYMANN, R., BOHMER, R. and HAGENE, B. Prelimina
data on relationships between lattice defects a
ultra-Hertzian absorption in iron oxides, 5392
FREY-WYSSLING, A. The submicroscopic structure
elementary cellulose fibrils, 5728
FRICK, F. C. and SUMBY, W. H. Control tower langua
707
FRICKE, H. The dielectric properties of two-bo
systems, 4072. The electric permittivity of a dil
suspension of membrane-covered ellipsoids, 6752
FRIDMAN, YA. B., ZILOVA, T. K. and ZHUKOVA, N.
On the influence of cracks upon the mechani
properties of the given material under differe
stress conditions, 5738
FRIED, B. D. The electron-neutron interaction
deduced from pseudoscalar meson theory, 623
FRIEDBERG, S. A. The specific heat of $CuCl_2.2H$
between 1·5 and 20°K, 3269
FRIEDE, E. *See* DAVIDSON, H. R., 6683
FRIEDEL, J. The absorption of light by noble metals a
its relations to the van der Waals contribution
the cohesive energy, 139. X-ray transition prob
bilities with special reference to *K* absorption
lithium, 1673. Anomaly of the $M_{IV,V}$ absorption
heavy elements, 4826. Anomaly in the rigidi
modulus of copper alloys for small concentratio
7986
FRIEDEL, R. A. and ORCHIN, M. Ultraviolet spectra
aromatic compounds, 7565
FRIEDHEIM, G. *See* KORTÜM, G., 768
FRIEDLAND, S. and KATZENSTEIN, H. S. Factors i
fluencing the life of self-quenching counters, 3374
FRIEDLANDER, F. G. On the oscillations of a bow
string, 8280
FRIEDMAN, A. I. *See* FEHR, E. B., 1553
FRIEDMAN, B. *See also* BOROWITZ, S., 2201
FRIEDMAN, B. and RUSSEK, J. Addition theorems f
spherical waves, 2562
FRIEDMAN, H. L. On the ultraviolet absorption spect
of uninegative ions, 2342
FRIEDMAN, R. and BURKE, E. Burning velocity
ethylene oxide decomposition flames, 3247.
theoretical model of a gaseous combustion wa
governed by a first-order reaction, 4441
FRIEDRICH, L. Subtractive method of colorimetry wi
the Pulfrich photometer, 6681
FRIEDRICHS, K. O. Mathematical aspects of the quantu
theory of fields. IV. 2183; V. Fields modified
linear homogeneous forces, 6449. On the asymptot
description of scattering processes, 5856
FRIEMAN, E. A. and MOTZ, L. The proton-prot
reaction and energy production in the sun, 2691
FRIESEN, S. VON. *See* VON FRIESEN, S.

IMMER, M. Application of the radioactive and stable isotopes in pharmacological research, 5053
INGANT, A.-M. *See* BERGER, J., 11, 7389
ISCH, H. L. An equipartition principle of generalized canonical ensembles, 7377
ISCH, H. L. and COLLINS, F. C. Diffusional processes in the growth of aerosol particles, 1225*
ISCH, H. L., SIMHA, R. and EIRICH, F. R. Statistical mechanics of polymer adsorption, 3697
ITSCH, V. Geoelectric investigation for the determination of lightning risks, 7364
ITZ, H. *See* WICKE, E., 6159
ITZ, N. L. Analog computers for coordinate transformation, 1333
ITZE, H. W. Measurement of thicknesses up to 10 mm with X-rays and Geiger counter, 4827
ITZSCHE, H. The influence of absorbed oxygen on the electrical conductivity of zinc oxide, 1632
ÖBERG, C.-E. Hexadecimal conversion tables, 2896. *See also* GOLDSTEIN, A. A., 1335
OELICH, H. C. Copper-activated zinc sulphide phosphors with new emission characteristics, 1541. Sensitized electroluminescent response, 4027
ÖHLICH, H. Interaction of electrons with lattice vibrations, 2580
OHNMEYER, G., GLOCKER, R. and MESSNER, D. On the wavelength dependence of the conductivity produced in CdS crystals by X- and γ-irradiation, 7668
OMAGEOT, A. The concept of entropy in the calculation of probabilities, 636
OMAN, D., KENNEY, J. and REGENER, V. H. Collision lengths of neutral, penetrating-shower-producing cosmic radiation in light and heavy water, 7763
ÖMAN, P. O. On the influence of spin and isotopes in the kinematical theory of neutron diffraction, 2748
ÖNSDAL, C. and ORE, A. Three-particle Coulomb problems, 8236
OOME, K. D. An electronically operated Kerr cell shutter, 2132. Current densities of free-moving cathode spots on mercury, 6069
OSCH, R. A. and FOLEY, H. M. Magnetic hyperfine structure in diatomic molecules, 1814
OST, A. A. and KALKWARF, D. R. A semiempirical equation for the vapor pressure of liquids as a function of temperature, 2406
OST, A. A. and MUSULIN, B. A mnemonic device for molecular orbital energies, 4262
OST, E. J. *See* FAIRWEATHER, A., 4080, 7661
OST, R. H. and NIELSEN, C. E. The specific probable ionization of electrons observed with a Wilson cloud chamber, 7727
OTA-PESSÖA, E. *See* ARAGÃO, M. B., 2106
OULA, H. Direct measurement of images in the electron microscope, 4414
UCHT, A.-H. The velocity of ultrasound in human and animal tissue, 5913
UEH, A. J., JR. An extension of the 'difference Patterson' to facilitate the solution of order-disorder problems, 8092
ÜHLING, H.-G. and MARTERSTOCK, J. Photometry of fluorescent lamps, 8302
Y, F. J. *See* WALL, P. D., 4521
Y, G. A. The use of the Luckiesh-Moss visibility meter for prescribing illumination, 101
Y, G. A. and ALPERN, M. The effect on foveal vision produced by a spot of light on the sclera near the margin of the retina, 4526. The effect of a peripheral glare source upon the apparent brightness of an object, 4527
Y, R. B. *See* FRY, W. J., 2274
Y, W. F. A Li^9 disintegration in a photographic emulsion, 2648. Evidence for the emission of a neutrino following the nuclear capture of a negative μ-meson, 6223. Unusual π-μ decays in photographic emulsions, 7174. Electrons associated with negative μ-mesons, 8697. *See also* EBEL, M. E., 1851; MORINAGA, H., 8696
Y, W. F. and WHITE, G. R. Range distribution of μ-mesons from π-meson decay in photographic emulsion, 4381
Y, W. J. Action of ultrasound on nerve tissue—a review, 2273
Y, W. J. and FRY, R. B. Temperature changes produced in tissue during ultrasonic irradiation, 2274
FRYXELL, R. E. and NACHTRIEB, N. H. Effect of stress on metal electrode potentials, 7249
FUBINI, S. On the equivalence of two definitions of the S-matrix, 1387. The Dyson–Feynman operator $U(t)$, 7466. Non-adiabatic treatment of nucleon pion scattering, 8235. *See also* CAIANIELLO, E. R., 7442
FUCHS, J. An equation for the numerical value of Sommerfeld's fine structure constant, 6185. The significance of the quantum of action, 6450
FUERTES, F. A. Impulse and mass in relativistic mechanics, 21. On the radiation emitted by electrons in uniform motion, 268
FUJIBAYASHI, K. *See* YOSIOKA, K., 699
FUJIKI, Y. and SUGANUMA, R. On the structure loosening of metal films deposited from the vapour, 8717
FUJIMOTO, Y. and TAMURA, T. A note on the Fermi's theory of meson production, 473. Slow neutrons in the cosmic radiation. I, 8484
FUJIMURA, J. *See* NAGAHARA, T., 3596
FUJIMURA, T. *See* OKAMURA, T., 4079
FUJITA, H. Diffusion with a sharp moving boundary, 5326. Diffusion accompanied by absorption of the Langmuir type, 8266
FUJIWARA, I. Operator calculus of quantized operator, 2942
FUKUDA, H. Multiple meson production by high energy nucleon-nucleon collisions, 2736
FUKUDA, Y. *See* SHIBUYA, Y., 4244–5
FUKUI, K., NAGATA, C. and YONEZAWA, T. A contribution to the theory of light absorption of symmetrical polymethine dyes, 3487
FUKUI, K. YONEZAWA, T. and NAGATA, C. A free-electron model for discussing reactivity in unsaturated hydrocarbons, 3503
FUKUROI, T. On the width of forbidden energy zone of tellurium, 4088. *See also* SHIBUYA, Y., 4244–5
FUKUROI, T. and MUTO, Y. Electrical contact resistance between metallic surfaces subjected to various treatments, 4100
FUKUROI, T. and SHIBUYA, Y. The measurement of the Young's modulus of metals and alloys by an interferometric method. II. The influence of heat-treatment on the Young's moduli and densities of Mi-Mn alloys, 4399
FUKUROI, T. and YASUHARA, K. Effects of cold working and heat treatment on the magnetic properties of nickel sheets, 4216
FUKUSHIMA, E. and OOKAWA, A. The transition structure of the grain boundary observed in soap bubble raft, 8711. On the dynamical behaviour of the grain boundary in bubble raft under shear stress, 8712
FUKUYAMA, I. *See* TANAKA, K., 8362
FULBRIGHT, H. W. A search for the double beta decay of tin 124 and zirconium 96, 5014. *See also* BROMLEY, D. A., 2697
FULBRIGHT, H. W., BRUNER, J. A., BROMLEY, D. A. and GOLDMAN, L. M. Angular distributions of protons and tritons from deuteron-induced reactions on Be^9, 1122
FULLER, C. S. and DITZENBERGER, J. A. Diffusion of lithium into germanium and silicon, 7196
FUMI, F. G. The direct-inspection method in systems with a principal axis of symmetry, 530. Matter tensors in symmetrical systems, 7965
FUMI, F. G. and WOLFENSTEIN, L. Allowed final states for annihilation into three photons, 5698
FUNATOGAWA, Z. *See* GONDÔ, Y., 1650
FUOSS, R. M. *See* SACKS, F. M., 7240
FURRER, W. and LAUBER, A. The accuracy of reverberation time measurements with warble tones and white noise, 2302
FURST, M. *See also* KALLMANN, H., 920
FURST, M. and KALLMANN, H. Fluorescent light yield with alpha, beta, and gamma radiations, 8340
FURST, M., KALLMANN, H. and KRAMER, B. Absolute light emission efficiency of crystal anthracene for gamma-ray excitation, 2379
FÜRTH, R. [Conf. rep.]. The dimensions of physical quantities, 6440
FURUICHI, J. *See* MITSUI, T., 4481
FURUTSU, K. On the theory of diffraction of the electromagnetic wave by mountains, 8590
FUSCHILLO, N. A critical study of the asymmetrical temperature gradient thermoelectric effect in copper and platinum, 1649

Fusfeld, H. I. Effect of cold work and anneal on resistivity of alpha brass, 7667

Fuson, N. *See also* Josien, M.-L., 1509, 1808, 2595, 8748

Fuson, N., Josien, M.-L., Jones, E. A. and Lawson, J. R. Infrared and Raman spectroscopy studies of light and heavy trifluoroacetic acids, 138

Fyfe, W. S. Conditions for the formation of hydrogen bonds, 2035

Gaebler, O. H. A method for continuous flushing of an infrared spectrophotometer with dry nitrogen, 7552

Gager, W. B. *See* Smith, T. S., 3315

Gailar, N. *See* Benedict, W. S., 7575–6

Gailar, N. M. and Plyler, E. K. The $3\nu_3$ bands of carbon disulfide and carbon dioxide, 2349

Gailar, O., Seidlitz, L., Bleuler, E. and Tendam, D. J. Range-energy relations for alpha-particles and deuterons in the Kodak NTB emulsion, 2882

Gailloud, M. and Haenny, C. Discrimination between the tracks due to charged particles and fog due to gamma radiation, in nuclear emulsions, 2884. Selective development of nuclear emulsions. Discrimination between tracks and gamma-ray fog, 2885

Gaines, G. L., Jr and Thomas, H. C. Adsorption studies on clay minerals. II. A formulation of the thermodynamics of exchange adsorption, 4436

Galanin, A. D. The relativistic equation of interacting particles, 5298

Galbraith, W. *See also* Jelley, J. V., 8132

Galbraith, W. and Jelley, J. V. Light pulses from the night sky associated with cosmic rays, 4513

Galbraith, W. and Whitehouse, W. J. The interaction of negative μ-mesons with uranium nuclei, 4341

Gallagher, C. J. Plastic deformation of germanium and silicon, 1190

Gallagher, J. F. *See* Hodgson, E. R., 2720

Gallaher, L. J. and Cheston, W. B. Angular correlations in $(d, p\text{-}\gamma)$ reactions, 1121

Galli, M. The relativistic deformations of a rotating cylinder. II, 2933

Gallmann, A. *See* Gorodetzky, S., 7878

Gallone, S. and Orsoni, L. On the transient regime of nuclear reactors with reflectors, 2729

Gallone, S. and Salvetti, C. Liquid drop behaviour of an independent particle nuclear model, 7834

Galloni, E. E. X-ray diffraction by structures consisting of bundles of parallel chains displaced along their axis, 542. *See also* Busch, R. H., 548

Galloni, E. E. and Pugliese, J. Preliminary study of the structure of $Te(CH_3)_2I_2$, 1265

Gallop, J. W. A heavy-particle accelerator, 4147

Galonsky, A. I. *See* Jackson, H. L., 2611, 2688

Gal'perin, B. S. The problem of the conductivity of an electric contact, 6052

Galt, J. K., Andrus, J. and Hopper, H. G. Motion of domain walls in ferrite crystals, 8575

Galy, A. The Raman spectrum of hydrated barium chloride ($BaCl_2.2H_2O$), 2374. Raman spectrum of hydrated aluminium chloride, 3167. *See also* Chapelle, J., 6663

Gamba, A. and Verde, M. On a question of nuclear spectroscopy, 4277

Gamburtsev, G. A. On high-frequency seismometry, 7338

Gammel, J. L. *See* Christian, R. S., 7188; Dodder, D. C., 1689

Gamo, H. The Faraday rotation of waves in a circular waveguide, 4229

Gamo, I. On the fundamental vibrations of ammonia and the ammonium ions, 5629

Gamow, G. Expanding universe and the origin of galaxies, 4559. Ylem theory of the origin of atomic species, 6437

Ganguly, S. C. and Choudhury, N. K. Polarized fluorescence of molecules of some single organic crystals, 3160. The percentage fraction of polarization in the fluorescence of organic single crystals, 6653

Ganz, D. *See* Sittkus, A., 8647

Ganzhorn, K. Group theory and quantum mechanics of the structure of the transition metals, 8611

Garach, J. Study of the infra-red spectrum of dicyclohexyl, 6619

Garaycochea, I. *See* Joel, N., 8080

Garber, C. S. *See* Simons, J. H., 4151

Garcia-Verduch, A. and Lindner, R. Auto-diffus in barium titanate, 4405

Gardner, J. W. Energy selection of charged parti by a magnetic field, 4843

Gardon, R. An instrument for the direct measurem of intense thermal radiation, 6012

Garelli, C. M. *See* Arton, M., 8327

Garfitt, R. G. *See* Page, R. S., 1679

Garg, S. N. On continuous absorption in near ult violet spectrum of toluene at high temperatu 4021

Garif'yanov, N. S. Paramagnetic resonance abso tion in a single crystal of gadolinium nitra 5569

Garlick, J. K. Reflexion coefficient of radio waves fr frozen terrains, 3459

Garnier, R. Observations on the preceding commu cation, 7417

Garnir, H. G. Propagation of the wave from an stantaneous point source in two semi-infinite mec 4679

Garrard, L. *See* Jackson, E. W., 4334

Garrido, J. An algebraic method of calculating signs of the structure factors in X-ray crystallograp 1256

Garrigue, H. On the abnormal radioactivity of atmosphere, 2101. Observations on the impuri in free air, 8133

Garrison, W. M., Haymond, H. R., Powell, H., Cor C. and Hamilton J. G. A centrifugal pump tar assembly for the cyclotron bombardment of liqui 7119

Garski, H. On the origin of single tracks with h grain density caused by cosmic rays in photograp plates, 945

Garstens, M. A. and Liebson, S. H. Paramagne resonance in liquids, 325

Garton, W. R. S. A demountable flash-discharge tu for production of the Lyman continuum, 4752. *also* Barrow, R. F., 4001

Garwin, R. L. A servomechanism for the eliminat of time lag, 1686. The design of liquid scintillat cells, 2377. A search for V^0-particles produced 450-MeV protons, 4389. A fast coincidence-an coincidence analyzer, 8473

Gaskell, T. F. and Swallow, J. C. Seismic refract experiments in the Pacific, 2091

Gáspár, R. An analytical method for the approxim determination of the eigenfunctions and energies electrons in atoms, 1852. The cohesive propertie aluminium, 2581. On an analytic approximat procedure for the determination of eigenfuncti and energy eigenvalues of atomic electrons. I, 26 Coherent scattering of X-rays and high-speed el tron rays by atoms. The atomic form-fact 7047

Gáspár, R. and Kónya, A. On the theory of the molecule, 7818

Gatfield, E. N. An apparatus for determining velocity of an ultrasonic pulse in engineer materials, 90

Gatterer, A. On the carbon flame method and application to the excitation of pure band spect 4692

Gatti, E. An eighty-channel velocity selector neutrons, 6241. *See also* Colli, L., 917

Gatti, E., Germagnoli, E., Persano, A. and Zimmer, Boron layer scintillation neutron detectors, 7963

Gaultier du Marache, J. *See* du Marache, Gaultier

Gaume-Mahn, F. Ferromagnetism of some ga linium-magnesium alloys, 318

Gauthé, B. and Blum, J. M. Demonstration of natural radioactivity of rhenium by the nucl emulsion method, 4980

Gauthier, G. Attempt to interpret absorption spec in the near infrared. I. Aliphatic saturated hyd carbons, 5387; II. Benzene, 5388

Gautier, P. Measurement of the 1st and 2nd deri tives of the axial induction in a strong magnetic le 260

Gavin, G. B. *See* Stewart, H. B., 7158

Gay, P. and Hirsch, P. B. The crystalline character abraded surfaces, 4400

AUTHOR INDEX

y, P. and Kelly, A. X-ray studies of polycrystalline metals deformed by rolling. I. The examination of the harder metals, copper, nickel and iron, 2758; II. Examination of the softer metals, tin, zinc, lead and cadmium, 2759
ydon, A. G. *See also* Broida, H. P., 7233
ydon, A. G. and Wolfhard, H. G. Flames: their structure radiation and temperature, 7627
yhart, E. L. *See* Edmondson, R. B., 1565; Olsen, H. L., 186
ze, V. F. *See* Shaĭn, G. A., 2154, 6435
zzara, C. P. *See* Robinson, S. A., 1240
ach, G. A. The theory of sintering, 3627
balle, R. *See* Harrison, M., 6897
bauer, R. and Kreyszig, E. The production of strongly luminous canal rays, 6853
ddes, W. K. E. *See* Axon, P. E., 5368
e, A. E. *See* Yoder, P. R., Jr, 7543
erk, J. and Heinz, C. Second-order focusing in a wedge-shaped magnetic field, 4869
guzin, Ya. E., Markon, L. O. and Pines, B. Ya. Self-diffusion and viscous flow (sintering and creep) in compressed metal powders, 7967
héniau, J. Nuclear space and shell structure, 1031
hman, S. D. *See* Morris, W. E., 1453
iger, J. S., Hogg, B. G., Duckworth, H. E. and Dewdney, J. W. The Zr^{92}-Mo^{92} and Zr^{94}-Mo^{94} pairs and the Zr^{96}-Mo^{96}-Ru^{96} triplet, 2632
iger, K. The radioactive decay of tellurium^{131}, 2652
iger, R. H. *See* Goldstein, L., 2473
ilikman, B. T. On the quantum theory of wave fields, 8233
iseler, G. Empirical function for the calculation of the normal entropy of gases and vapour forming compounds, 6027
isler, A. H. Coercive force of precipitation alloys, 8545. *See also* Martin, D. L., 4918
ist, D. *See also* Seiler, K., 604
ist, D. and Seiler, K. The temperature dependence of the current flow in germanium *p-n* junctions, 230
l'd, P. V. and Churchmarev, S. K. Interfacial tension between liquid non-miscible metals, 5324
linas, R. W. and Hanna, S. S. Magnetic analysis of the deuteron-beryllium reactions, 2698
ller, M. *See* von Hippel, A., 8397
lles, E. *See* Pitzer, K. S., 5633
ll-Mann, M. *See also* Brueckner, K. A., 4613
ll-Mann, M. and Goldberger, M. L. The formal theory of scattering, 7456
ll-Mann, M. and Telegdi, V. L. Consequences of charge independence for nuclear reactions involving photons, 7146
ltman, S. The mobility of helium molecular ions in helium, 6119
mant, A. Tracer diffusion in the ground in radioactive leak location, 2682
mmell, L. Efficiency of filter beds for treating radioactive waste, 1098
nin, J. *See* Vigneron, L., 8165
nkin, N. M. and Priporova, G. P. The Hall–Kikoin effect as an indicator of the structure of high speed steel, 5601
ntile, C. *See* Artom, M., 8327
ntner, W., Präg, R. and Smits, F. Age determinations by the potassium-argon method allowing for argon diffusion, 6327
nzel, L. The part of thermal radiation in the thermal conduction process, 8354
nzel, L. and Müser, H. On the photoelectric and optical properties of a special type of lead sulphide cells, 6056
nzel, L. and Neuroth, N. A modulated-beam method of measuring infra-red absorption at high temperatures, 4719
orge, E. P., MacAnuff, J. W. and Sturgess, J. W. Observations of extensive cosmic-ray showers below ground, 5557
orge, E. P., Redding, J. L. and Trent, P. T. Cloud chamber observations of the cosmic radiation underground, 6926
rathewohl, S. J. Conspicuity of steady and flashing light signals: variation of contrast, 8146
Gerber, R. A uniqueness theorem for flow of a heavy perfect fluid, 641. On the existence of plane, permanent, irrotational flows of incompressible fluids, uniform at infinity, 1409
Gerding, H. and Eriks, K. The Raman effect of $N_2O_4 . 3 SO_3$ and $N_2O_5 . 3 SO_3$, 4033
Gerding, H., Haring, H. G. and Renes, P. A. The Raman spectrum of liquid and solid gallium trichloride, 4728
Gerding, H. and Houtgraaf, H. The Raman spectra of the compounds $NaCl . AlCl_3$ and $NOCl . AlCl_3$, 4727
Gergely, G. *See* Valkó, I. P., 2372
Gerhardt, J. P. *See also* Crain, C. M., 5257
Gerhart, J. B. *See* Sherr, R., 7885
Gerischer, H. Alternating current polarization of electrodes with a potential-defined step at the equilibrium potential. II, 6293
Gerjuoy, E. Total reflection of waves from a point source, 5926. Theory of (*d,p*) and (*d,n*) reactions, 7922
Gerlach, W. Coercive force and magnetocrystalline energy, 1758
Germagnoli, E. *See* Gatti, E., 7963
Gerritsen, A. N. The magnetoresistances of alloys of a noble metal and a transition metal at low temperatures, 6809. *See also* Korringa, J., 8609
Gerritsen, A. N. and Linde, J. O. The electrical resistances of alloys of a noble metal and a transition metal, 2443
Gerstman, L. J. *See* Cooper, F. S., 713*
Gerthsen, C. and Kolb, W. On the "differential ionization" of α-rays in CdS crystals, 8480
Gerven, L. van. *See* van Gerven, L.
Geschwind, S. *See* Kisliuk, P., 5396
Getmantsev, G. G. Cosmic electrons as the source of galactic radio noise, 5273
Gevers, M. *See* Wijn, H. P. J., 8536
Gevers, R. Etch-pits and dislocations, 3710. Microscopic and interferometric observations on corrosion figures and their interpretation in terms of dislocation, 7286
Gevers, R., Amelinckx, S. and Dekeyser, W. Interferometric study of etch pits, 2055
Gey van Pittius, E. van A. *See also* De Vos, P. J. G., 6920
Gey van Pittius, E. van A. and Van Heerden, I. J. The knock-on electrons produced by mesons in lead, 7166
Ghiorso, A. *See* Elson, R., 2726; Fleming, E. H., Jr, 1059; Hulet, E. K., 3547; Hyde, E. K., 4308; Rasmussen, J. O., Jr, 1877
Ghormley, J. A. *See* Hochanadel, C. J., 7253
Ghosh, A., Kastner, J. and Whyte, G. N. Gamma-ray output of radium, 8667
Ghosh, B. N. and Rakshit, S. C. A note on the evaluation of true zeta-potential of colloidal particles in the presence of equicoagulating concentration of different electrolytes, 6811
Ghosh, N. L. On the equilibrium of a thin atmosphere round a heavy central core: spheroidal and anchor-ring configurations, 3827
Ghosh, S. N. *See also* Trambarulo, R., 5644
Ghosh, S. N., Trambarulo, R. and Gordy, W. Electric dipole moments of several molecules from the Stark effect, 2603
Giacomini, A. Contribution to ultrasonic measuring techniques, 3067
Giacomo, P. Direct method of measurement of the characteristics of a Fabry–Pérot interference system, 3178. *See also* Lesquibe, F., 6668
Giamboni, I. A. *See* Barnett, S. J., 329
Giannuzzi, M. A. Relation between the absolute atmospheric humidity and the coefficient of transmission of solar radiation according to the measurements made at the Observatory of Rome from 1935 to 1950, 5242
Gibbons, J. E. and Witham, W. C. Insulating liquids, 828
Gibbons, J. J. and Schrag, R. L. A method of solving the wave equation in a region of rapidly varying complex refractive index, 1786
Gibbons, J. J., Schrag, R. L. and Waynick, A. H. Long-delay ionospheric echoes at 150 kc/s, 4234
Gibbs, D. S. *See* Svec, H. J., 2982

AUTHOR INDEX

Gibert, R. On the thermodynamics of irreversible processes, 7645
Gibson, A. F. Injected absorption in germanium, 6780. *See also* Lawrance, R., 3300
Gibson, G. E., Blake, N., and Kalm, M. The photochemical decomposition of benzene, 6296
Gibson, K. S. *See* Davis, R., 3197
Gibson, R., Ingham, J. and Postle, L. J. An instrument for measuring small forces, 4632
Gibson, W. M. A study of the reaction $^{11}B(d,n)^{12}C$ by an improved photographic method, 4353
Gierke, H. E. von. *See* von Gierke, H. E.
Gieseke, W. *See* Kornetzki, M., 6130
Gigli, A. *See* Amaldi, E., 4194, 7781
Giguère, P. A. and Liu, I. D. Infrared spectrum, molecular structure, and thermodynamic functions of hydroxylamine, 2592
Gijsman, H. M. *See* van den Handel, J., 2538
Gilardoni, A. and Schwarz, G. S. Magnification of radiographic images in clinical roentgenology and its present-day limit, 4546
Gilbert, F. C. *See* Colgate, S. A., 2681
Gilbert, R. L. G. Gravity observations in a borehole, 13
Gilbert, W. S. and Rosengren, J. W. Deuteron photodisintegration at high energies, 1128
Giles, C. G. *See* Collins, R. B., 8172
Gilet, P. M. and Watson, G. S. Calculation of accuracy of results of graphical square intercomparisons, 5830
Gilford, C. L. S. Membrane sound absorbers and their application to broadcasting studios, 4673
Gilford, S. R., Gregg, D. E., Shadle, O. W., Ferguson, T. B. and Marzetta, L. A. An improved cuvette densitometer for cardiac output determination by the dye-dilution method, 8821
Gilinskaya, É. A. *See* Bokiĭ, G. B., 7332, 8108
Gill, S. *See* Wilkes, M. V., 2139
Gillam, E. and Cole, D. G. Studies of continuous phase transformations with X-rays, 7978
Gillam, E. and Heal, H. T. Some problems in the analysis of steels by X-ray fluorescence, 528
Gilleo, M. A. Photoemission from silver into AgCl, KBr, NaCl, and new bands of photosensitivity in AgCl, 7679
Gilles, A. and Vodar, B. Variation with temperature of the transparency of some optical materials in the Schumann region, 140
Gilles, P. W. and Margrave, J. L. The dissociation energy of fluorine, 3491
Gillespie, C. A. *See* Squires, P., 4496
Gillespie, T. The effect of the electric charge distribution on the ageing of an aerosol, 4451
Gillespie, T. and Langstroth, G. O. An instrument for determining the electric charge distribution in aerosols, 2792
Gilley, L. W. *See* Lagemann, R. T., 5319
Gillings, D. W. *See* Bronowski, J., 3654
Gillham, E. J. A method for measuring the spectral reflectivity of a thermopile, 7638
Gillis, J. *See* Dostrovsky, I., 523, 3708
Gilvarry, J. J. Relativity precession of the asteroid Icarus, 2931
Gindsberg, J. and Beers, Y. Circuit for a radio-frequency spectrometer, 8585
Ginell, W. S. and Simon, G. P. Preparation of tagged spherical clay particles, 5050
Ginther, R. J. *See* Schulman, J. H., 1538, 4029
Ginzburg, V. L. On the influence of the electron-electron impacts upon the absorption of radio-waves in the *F*-layer of the ionosphere and in the corona of the sun, 338. Behaviour of superconducting films in a magnetic field, 5474. Introduction of anisotropy into the theory of superconductivity, 5480
Giovanelli, R. G. An omnidirectional photometer of small dimensions, 8305
Gipps, G. de V. *See* Strohfeldt, M., 562
Giraudel, B. *See* May, S., 3677
Gis, K. *See* Jensen, P., 5070
Giulotto, L. *See* Chiarotti, G., 7839
Gjellestad, G. Magneto-hydrodynamic oscillations of a star, 3829
Gladyshevskiĭ, E. I., Kripyakevich, P. I. and Teslyuk, M. Yu. Crystal structure of the ternary phase Cu_4MgSn, 5217
Glang, R. *See* Hauffe, H., 6285
Glaser, D. A. Bubble chamber tracks of penetrat
cosmic-ray particles, 7765
Glaser, F. W., Moskowitz, D. and Post, B. An inve
gation of boron carbide, 6249
Glaser, W. Foundations of electron optics, 3347
Glaser, W. and Zimmermann, W. On the descript
of bound states in field theory, 5851
Glass, I. I. On the speed of sound in gases, 3943
Glass, N. W., Jensen, L. K. and Richardson, J.
The short-lived radioisotopes P^{28} and Cl^{32}, 5672
Glasscock, W. R. *See* Holter, N. J., 569, 670
Glasser, R. G. *See also* Schein, M., 7909
Glasser, R. G. and Schein, M. The energy of nucle
nucleon collisions, 4336
Glasstone, S. *See also* Taylor, H. S. [Eds.], 5147
Glasstone, S. and Edlund, M. C. The elements
nuclear reactor theory, 7939
Glättli, G., Seippel, O. and Stoll, P. Absolute de
mination of the Cu^{63} (γ,n) and C^{12} $(\gamma^3\alpha)$ cro
sections for lithium γ-rays, 5069
Glauber, R. and Schomaker, V. The theory of elect
diffraction, 2837
Glauberman, A. E. On the question of energy excha
between translational motion and molecular vib
tion and rotation. I., 5610. On the formation
equations for equilibrium distribution functions
molecules, 8613
Glauberman, A. E. and Dorogan', V. I. On the qu
tion of energy exchange between translatio
motion and molecular vibration and rotation.
5611
Glauberman, A. E. and Lubchenko, A. F. Theory
the dielectric properties of barium titanate
stationary fields, 5456
Glauberman, A. E. and Yukhnovskiĭ, I. P. On
statistical theory of concentrated solutions of str
electrolytes. I, 654; II, 655
Glaubman, M. J. Spins and parities of excited state
even-even nuclei. I, 6173
Glaysher, G. H. *See* Farmer, M. H., 3667
Glazer, H. and Reiss, H. Application of the Fer
Thomas model in computing the dipole moment
iodine chloride, 5647
Gleissberg, W. Information concerning the 80-y
sunspot cycle in ancient auroral observations, 74
Gleitsmann, G. *See* Holzapfel, L., 5909
Gleĭzer, M. D. Thunderstorms in Central Asia, 881
Glemser, O. *See also* Hartert, E., 6313
Glemser, O. and Butenuth, G. Changes in KM
under electron bombardment in relation to its ther
decomposition, 5137
Glenn, H. B. The reaction $Li^6(\gamma,d)He^4$ at 2·76 M
450
Glick, H. L. *See* Halteman, E. K., 2753
Glocker, R. *See also* Breitling, G., 1072; Fro
meyer, G., 7668
Glockler, G. Bond energies and bond distances
hydrocarbons, 6998. Resonance energies of benz
and butadiene, 7010. *See also* McCulloh, K.
1507
Glockler, G. and Ven Horst, H. The Pirani gau
1427
Gloersen, P. *See* Bullock, B. W., 739
Glover, R. E., III. Demonstration of wave interfere
and in particular group velocity, 6575
Gluckstern, R. L. *See also* McIntosh, J. S., 912
Gluckstern, R. L. and Hull, M. H., Jr. Polarizat
dependence of the integrated bremsstrahlung cr
section, 6074
Gluckstern, R. L., Hull, M. H., Jr and Breit,
Polarization of bremsstrahlung radiation, 6073
Glushkova, V. P. *See* Golder, G. A., 6324
Glusker, D. L., Thompson, H. W. and Mulliken, R
Infrared spectra of solutions of iodine, 7570
Gnaedinger, R. J., Jr. *F*-bands in some mixed crys
of the alkali halides, 2812
Goble, O. L. A photoelectric densitometer, 5372
Gobrecht, H. and Ergang, H. The oxidation
nitrogen by irradiation of water containing air v
ultrasound, 8029
Gobrecht, H. and Speer, F. A contribution to
measurement of secondary electron emission, 77
Goddard, P. E. and Urbach, F. Ionic mobility
grain boundaries, 2011

save, G. A. E. Rates of combustion of solid fuel particles, 2408

ckermann, R. H. *See also* Forsthoff, C. W., 7074

ckermann, R. H. and Seitzer, W. H. The average energy of Sr^{90}-Y^{90} as a function of absorber, 1065

ddel, W. V. *See* Feldman, M. H., 1170

rtz, R. C. Remote control engineering. Fundamentals of general-purpose remote manipulators, 2635

rtz, R. C. and Bevilacqua, F. Remote control engineering. A force-reflecting positional servomechanism, 2636

s, M. L. *See* Roy, R. R., 8655

gate, D. V. *See* Kapadnis, D. G., 3234

goberidze, D. B. and Kirvalidze, I. D. Investigation of fatigue phenomena on monocrystals of rock salt using an optical method, 1993

in, G. R. Measuring changes in length to one part in a million, 7478

khale, B. G. Contribution to the study of the widths of X-ray spectral lines, 3343

khale, G. S. *See* Rao, A. S., 7777

ay, M. J. E. Multislit multipass spectrometers, 2325. *See also* Keck, P. H., 5195

d, L. Modified distribution functions for ethylene oxide-type polymerizations, 525. Method of time-free solutions for radio-active decay and radionuclide production, 2647. Molecular size distribution in the copolymerization of N-carboxyamino acid anhydrides, 7259

d, T. *See* Bondi, H., 596

dberg, B. *See* Liben, W., 4751

dberg, C. Acceptors produced in germanium by quenching from high temperatures, 847

dberg, E. Levels of Al^{25} from the $Mg^{24}(d,n)Al^{25}$ reaction, 2701. *See also* Jackson, H. L., 2688; Kaufmann, S. G., 1105

dberg, J. N. Strong conservation laws and equations of motion in covariant field theories, 2182

dberg, J. N., Trischka, J. W. and Bergmann, P. G. Electric resonance transitions in a tapered electric field, 1946

dberg, L. *See* Mohler, O. C., 3814

dberg, M. D. Neutron cross sections in the Mev region, 7149. *See also* Hughes, D. J., 5724

dberg, R. J. Inhibition of the gelation of gelatin by autoclaved gelatin, 1226

'dberg, Z. A. *See* Shaposhnikov, I. G., 5342

dberger, M. *See* Brueckner, K. A., 4613

dberger, M. L. *See* French, J. B., 437; Gell-Mann, M., 7456

dblith, S. A. *See* Davison, S., 8649

de, H. *See* Bock, H., 6735

demberg, J. *See also* Montalbetti, R., 7930

demberg, J. and Katz, L. Resolution of the "photon difference method," 4358. High energy gamma-gamma cross section of In^{115}, 4360

den, R. K. *See* Baños, A., Jr, 1273

der, G. A., Zhdanov, G. S. and Umanskiĭ, M. M. A study of the crystalline structure of trichlorbenzonitrile, 6325

der, G. A., Zhdanov, G. S., Umanskiĭ, M. M. and Glushkova, V. P. The X-ray study of crystals of certain nitro- and halogen derivatives of benzene and naphthalene, 6324

dfarb, L. J. B. and Feldman, D. High energy proton-proton scattering and associated polarization effects, 913

dhaber, G. Study of elastic pion-hydrogen scattering in photographic emulsions, 4387. *See also* Arase, E., 5105

dhaber, M. Classification of nuclear isomers, 4276. "Core isomerism"—remarks on Mo^{93m}, 4281. *See also* Bainbridge, K. T., 4985; Kraushaar, J. J., 3563

dhaber, M. and Hill, R. D. Nuclear isomerism and shell structure, 1022

dhaber, S. *See* Arase, E., 5105

'dman, I. I. On the spectroscopic determination of the quadrupole moments of nuclei, 7043

dman, J. E. Atomic moments in alloys, 8516

dman, L. M. Elastic scattering of 6·5-MeV protons from copper, 2500. *See also* Fulbright, H. W., 1122

dman, R. G. and Hubbard, D. pH response of non-hygroscopic glasses, 2787

Goldring, G. Internal pairs in anisotropic emission, 5047

Goldsack, S. *See* Dilworth, C., 7120

Goldsack, S. J. and Kannangara, M. L. T. Cosmic rays at 60 m.w.e. underground. II. The hard and soft components, 7754

Goldschmidt, G. *See* Bishop, G. R., 1896

Goldschmidt-Clermont, Y. *See also* Merlin, M., 1714

Goldschmidt-Clermont, Y., Osborne, L. S. and Scott, M. B. Photoproduction of neutral mesons in hydrogen, 2712

Goldsmith, G. J. *See* Bleuler, E., 2633

Goldstein, A. A. and Fröberg, C.-E. A collision path from the Earth to the Moon in the restricted problem of three bodies, 1335

Goldstein, H. Neutron data needed for shielding and reactor design, 8706

Goldstein, H., Wilkins, J. E., Jr and Spencer, L. V. Systematic calculations of gamma-ray penetration, 4321

Goldstein, J. H. *See* Morgan, H. W., 1528; Wilcox, W. S., 366, 4015

Goldstein, J. S. *See* Salpeter, E. E., 5866

Goldstein, L. Some points of the theory of liquid helium II, 2414

Goldstein, L., Anderson, J. M. and Clark, G. L. Interaction of microwaves propagated through a gaseous discharge plasma, 4929. Quenching of afterglow in gaseous discharge plasmas by low power microwaves, 5492

Goldstein, L., Lampert, M. A. and Geiger, R. H. Determination of electron density and collision frequency in a gaseous discharge by microwave propagation measurements, 2473

Goldstein, M. Scattering factors for certain polydisperse systems, 7615. *See also* Benoit, H., 5985; Edsall, J. T., 1563

Goldstein, S. On the mathematics of exchange processes in fixed columns. I. Mathematical solutions and asymptotic expansions, 7228; II. The equilibrium theory as the limit of the kinetic theory, 7229

Goldsztaub, S. *See* Foex, M., 6951

Goldwasser, E. L., Mills, F. E. and Hanson, A. O. Ionization loss and straggling of fast electrons, 902

Gollan, F. *See* Clark, L. C., Jr, 2107

Golovastikov, N. I. *See* Belov, N. V., 2083

Golovner, T. M. *See* Borovskiĭ, I. B., 5503

Gol'tsev, V. D. *See* Kokhanenko, P. N., 8319

Gombás, P. The statistical theory of the nucleus. I, 2605; II, 2606. On the angular momentum distribution of the nucleons in a nucleus, 2607. Further development of the statistical theory of nuclei, 7028. Difference beween the density distribution of neutrons and protons in atomic nuclei, 7836

Gomer, R. Velocity distribution of electrons in field emission. Resolution in the projection microscope, 886. Field emission from nickel surfaces, 2477. Note on field emission, 4831

Gomer, R. and Hulm, J. K. Field emission from tantalum in the normal and superconducting state, 236

Gomer, R. and Speer, D. A. Molecular images with the projection microscope. The ionization potential of zinc phthalocyanine, 1707

Goncharskiĭ, L. A. Electronic measuring instrument for small displacements, 2222. Electronic acceleration indicators, 5313

Gondô, Y. and Funatogawa, Z. On the magnetothermoelectric power of iron crystal at low temperatures, 1650

Gongwer, C. A. A study of vanes singing in water, 3031

Gonikberg, M. G. *See* Butuzov, V. P., 8358

Gonzales, O. D. *See* White, D., 2413

Good, R. H., Jr. The generalization of the WKB method to radial wave equations, 4263. On the theory of forbidden beta-transitions, 4311. *See also* Miller, S. C., Jr, 6485

Good, W. M. *See* Kunz, W. E., 7912

Goodell, J. D. Decision elements. III, 2140; IV, 2141

Goodell, W. F., Jr, Loar, H. H., Durbin, R. P. and Havens, W. W., Jr. Neutron energy distribution from the proton bombardment of Li, Be, and C at 375 MeV, 2692

Goodenough, J. B. A theory of the deviation from close packing in hexagonal metal crystals, 1799
Goodier, J. N. Comments on "Remarque on critical reflections of elastic waves at free surfaces," 686
Goodman, B. B. The thermal conductivity of superconducting tin below 1°K, 3317
Goodman, C. *See* Francis, A. E., 4363; Kiehn, R. M., 7152; McClelland, C. L., 8676
Goodman, L. E. and Sutherland, J. G. Elasto-plastic stress-optical effect in silver chloride single crystals, 6678
Goodman, L. S. Total cross sections for 14-MeV neutrons, 1135
Goodwin, D. W. and Macfadyen, K. A. Electrical conduction and breakdown in liquid dielectrics, 3341*
Goodwin, L. K. Design and performance of a radiofrequency ion source, 8464
Goody, R. M. A statistical model for water-vapour absorption, 4510; *See also* Yarnell, J., 559
Gora, E. Lower limits for interaction times in photon scattering processes, 1390
Gorbacheva, H. A. *See* Konstantinova-Shlezinger, M. A., 5402
Gordon, A. R. and Kay, R. L. Anomalous adjustment of indicator concentration in moving boundary measurements of transference numbers, 2801
Gordon, A. S. *See* McNesby, J. R., 7264
Gordon, D. I. An experimental study of Barkhausen noise in nickel-iron alloys, 8531
Gordon, R. L., Griffin, O. G. and Nagelschmidt, G. The quantitative determination of quartz by X-ray diffraction, 4461
Gordon, W. E. Statistical fluctuations in the atmosphere, 1302
Gordus, A. A. *See* Bernstein, R. B., 1521
Gordy, W. *See* Ghosh, S. N., 2603; King, W. C., 4713; Robinson, H. G., 4952; Trambarulo, R., 5644; Williams, Q., 367
Gorelik, G. S. On the application of the modulation method in optical interferometry, 5417. *See also* Brusin, I. Ya., 5418
Görisch, R. Investigations into the Callier effect. I, 8158
Gorke, K. *See* Jenckel, E., 3276
Gorman, J. W. *See* Isbin, H. S., 2731
Gorodetzky, S. *See also* Muller, T., 2506
Gorodetzky, S., Gallmann, A., Knipper, A. and Armbruster, R. Angular correlation α–γ in the transition AcC to AcC″. Upper limit of the mean life of the first excited state of AcC″, 7879
Gorter, C. J. Heat pulses in He II below 1°K, 804. Radiowave spectroscopy, 5385. Antiferromagnetism and antiferromagnetic resonance in a rhombic crystal at $T = 0$, 8539. Observations on antiferromagnetic $CuCl_2 2H_2O$ crystals, 8540. *See also* Bender, P. L., 2465; Bots, G. J. C., 6728; de Boer, J., 2411; de Vrijer, F. W., 2542; Kramers, H. C., 6730; Poppema, O. J., 4289
Gorter, E. W. *See also* Stuyts, A. L., 962
Gorter, E. W. and Schulkes, J. A. Reversal of spontaneous magnetization as a function of temperature in LiFeCr spinels, 4908
Görtler, H. *See* Collatz, L., 5879
Goss, A. J. The effect of added metallic impurity and of closed moulds on the growth from the melt of single crystals of tin, 3712. An optical goniometer for the examination of long metal single crystals, 7271. Heat flow and the growth of metal single crystals from the melt, 7284
Goss, A. J. and Vernon, E. V. The growth and orientation of single crystals of indium, 2053
Gossard, E. E. *See* Anderson, L. J., 8592
Gossen, W. *See* Feldman, M. H., 1170
Gossick, B. R. *See* Bray, R. 8421
Gossick, B. W. Post-injection barrier e.m.f. of p–n junctions, 8422
Goto, K. Wave equations in de Sitter space, 39
Goto, S. Note on the non-relativistic limit of the Compton scattering, 3877
Göttsche, H. The structure of thin aluminium-silver layers, 7199. The structure of thin silver layers, 7200
Gottschewski, G. H. M. Possible uses of the new Leitz phase contrast apparatus with a Heine condenser, 5989
Gottstein, K. On the splitting of heavy nuclei in cosmic rays, 6128
Gottstein, K. and Teucher, M. On the meson duction in the collision of energetic nucleons, 5
Goucher, F. S. and Prince, M. B. Interpretatio α-values in p-n junction transistors, 2452
Gough, V. E. *See* Morton, G. F., 6687
Gould, J. R. Experiments on the mechanics of ru II. The torsion, inflation and extension of a 3645
Gould, R. G. *See* Hayes, F. N., 6885
Gould, R. N. *See* Cunliffe, A., 8241
Goulding, F. S., Hammerton, J. C., Kelliher, M Merrison, A. W. and Wiblin, E. R. The dev ment of a neutron spectrometer for the interme energies, 7192
Goupil, R. Potential energy of the triatomic molecu and the origin of the 4050 Å group in com nuclei, 6419
Govaerts, J. and Lambrechts, A. Electrolytic d of radio-iron, 5751
Gove, H. E. and Wall, N. S. The angular distrib of gamma rays in the C^{12} $(p,p'\gamma)$ reaction, 2690
Gow, J. D. and Foster, J. S., Jr. A high-inte pulsed ion source, 8463
Gowan, E. H. and Leppard, R. E. Meteorol variations in the quantity of atmospheric over Edmonton (Lat. 53°34′ N. Long. 113°31′ 7348
Goward, F. K. *See also* Brinkworth, M. J., Wilkins, J. J., 8657
Goward, F. K. and Wilkins, J. J. Cross sectio the photodisintegrations $^{12}C(\gamma, 3\alpha)$ and $^{16}O(\gamma$ 5067. Cross-section for the photodisintegrat carbon into three α-particles, 5074
Gowenlock, B. G. Some theoretical consideratio ether decompositions, 7230
Gowenlock, B. G., Polanyi, J. C. and Warhur A determination of the dissociation energ mercury–carbon bonds by a pyrolytic method, The nature of mercury–carbon bonds in me alkyl radicals, 7263
Graaff, W. De. *See* De Graaff, W.
Grace, M. A. *See also* Ambler, E., 5653; Da J. M., 1841
Grace, M. A. and Halban, H. Nuclear alignm isotopes of cobalt, 4288
Grachev, A. A. Spatial correlations of the no cyclic magnetization reversal, 7788
Grad, H. The profile of a steady plane shock wav Statistical mechanics, thermodynamics, and dynamics of systems with an arbitrary num integrals, 4623
Graef Fernández, C. Gravitational field of a mass in arbitrary motion according to Birk theory, 594
Graffunder, W. Relations between high freq techniques and atomic and nuclear physics, 4
Graham, C. H. *See* Brown, J. L., 4531
Graham, R. L. *See also* Bell, R. E., 5049
Graham, R. L. and Bell, R. E. A determination half lives of some magnetic dipole γ-ray trans 3548
Graham, R. L. and Klemperer, O. On the desig 15 MeV β-ray spectrometer, 2490
Graham, R. L., Wolfson, J. L. and Bell, R. E disintegration of Tm^{170}, 7067
Grahame, D. C. Diffuse double layer theory fo trolytes of unsymmetrical valence types, Mathematical theory of the Faradaic adm (pseudo-capacity and polarization resistance),
Grand, R. Dipole moments of organic acids d from adsorption measurements at the surf polarized mercury, 7827
Grandine, L. D., Jr. *See also* Ferry, J. D., Fitzgerald, E. R., 7207
Grandine, L. D., Jr and Ferry, J. D. D mechanical properties of the system polys decalin, 5876
Grandmontagne, R. Temperature of the atmo and twilight discontinuities, 5247. Remarks calculation of atmospheric temperature, 5804
Grange, J. *See* de Mallemann, R., 4937, 7809
Granier-Mayence, J. *See also* Romand, J., 152
Granier-Mayence, J., Robin, J. and Robin, S. observations by spectrographic absorption decomposition of nitric oxide, 5742

ANIER-MAYENCE, J. and ROBIN, S. Perturbation of electronic bands of NO in the medium ultra-violet region by argon and by nitrogen at pressures up to 1000 atmospheres, 731

ANIER-MAYENCE, J. and ROMAND, J. Absorption spectrum of solid nitric oxide between 2400 and 1600 Å, 5394. Additional study on the absorption spectrum of solid nitrous oxide in the Schumann region, 8323

ANOVSKIĬ, V. L. On the plasma in rarefied gas at a variable current, 3335

ANT, D. E. *See* DAWSON, G. H., 723

ANT, F. A. and KRUMBEIN, A. D. The effect of temperature on the duration of the $^3P_2$ metastable level of neon, 4291

ASSMANN, P. *See* TROESCH, H. A., 6524

ATTIDGE, W. and JOHN, H. The electronic properties of barium sulfide, 294

AUE, A. *See* TRUMPY, B., 1913

RAVES, E. R. *See also* COON, J. H., 1137; FORBES, S. G., 6242; PHILLIPS, D. D., 1133

RAVES, E. R. and ROSEN, L. Distribution in energy of the neutrons from the interaction of 14-MeV neutrons with some elements, 2721

RAVES, G. A., LANGER, L. M. and MOFFAT, R. D. $K/(L+M)$ internal conversion ratios for $M4$ transitions, 425

RAVES, J. D., WEBB, L. A. and DAVIS, R. H. Performance of Lucite-bonded alpha-scintillation screens, 2370

RAVESON, R. T. *See* DIGIOVANNI, H. J., 6891

RAY, A. P. *See* SARGENT, B. W., 2651

RAY, J. A. The photosensitized oxidation of paraffins, 8023

RAY, W. C. *See* THOMPSON, D., 5746

REEN, A. *See* ADAM, J., 3730

REEN, A. E. S. and EDWARDS, D. F. Discontinuities in the nuclear mass surface, 7034

REEN, A. E. S. and ENGLER, N. A. Mass surfaces, 7033

REEN, C. D. *See* TER HAAR, D., 3278

REEN, D. T., ERRINGTON, R. F., BOYD, F. C. and HOPKINS, N. J. Production of multicurie gamma-ray teletherapy sources, 7117

REEN, H. S. The second virial coefficient near absolute zero, 2258. First-order meson wave equations, 2961. A generalized method of field quantization, 3861. Boltzmann's equation in quantum mechanics, 4658. Molecular theory of fluids, 7498. *See also* MESSEL, H., 2739

REEN, H. S. and MESSEL, H. The spread of the soft component of the cosmic radiation, 304

REEN, H. S., MESSEL, H. and CHARTRES, B. A. Angular distribution functions for high energy cosmic-ray particles, 1735

REEN, J. B. and LORING, R. A. The Zeeman effect in the spectra of tellurium, 3986

REEN, J. H. S., HARDEN, G. D., MACCOLL, A. and THOMAS, P. J. The unimolecular decompositions of some alkyl bromides, 3676

REEN, L. C., MULDER, M. M. and MILNER, P. C. Correlation energy in the ground state of He I, 7050

REEN, L. L., SCANLON, J. P. and WILLMOTT, J. C. A stripping reaction at low bombarding energy, 8682

REEN, M. The equation of the characteristic curve of photographic emulsions. I, 8160

REEN, M. W. *See* GREENBLATT, M. H., 930

REEN, R. F. and CALLEN, H. B. On a theorem of irreversible thermodynamics. II, 1595

REEN, T. A. The elastic scattering of π-mesons by deuterons, 5106

REEN, T. D. *See* HARTMAN, R. E., 2762

REEN, T. S. *See* EVANS, W. H., 3587

GREENBAUM, B. A. *See* BLISARD, T. J., 2558

GREENBERG, J. S. *See* WESTCOTT, C. H., 6893

GREENBLATT, M. H., GREEN, M. W., DAVIDSON, P. W. AND MORTON, G. A. Two new photomultipliers for scintillation counting, 930

GREENE, E. F. and HORNIG, D. F. The shape and thickness of shock fronts in argon, hydrogen, nitrogen, and oxygen, 3945

GREENFIELD, M. A. *See also* NORMAN, A., 4449; SPECHT, R. D., 2474

GREENFIELD, M. A. and HAND, K. Non-uniform filter to produce a flat isodose surface of roentgen-ray intensity, 1675

GREENFIELD, M. A., NORMAN, A., DOWDY, A. H. and KRATZ, P. M. Beta- and gamma-induced Cerenkov radiation in water, 1683

GREENHILL, E. B. and MCDONALD, S. R. Surface free-energy of solid paraffin wax, 1415

GREENHOW, J. S. *See* KAISER, T. R., 4560

GREENING, J. R. The spectral distribution of radiation from X-ray tubes, 258

GREENLAND, K. M. Interference filters in optics, 160

GREENOUGH, A. P. The deformation of silver at high temperature, 1982

GREENOUGH, G. B. *See* DERUYTTERE, A. E., 8724

GREENSMITH, H. W. and RIVLIN, R. S. The hydrodynamics of non-Newtonian fluids. III. The normal stress effect in high-polymer solutions, 2989

GREENSPAN, H. *See also* SNELGROVE, J. A., 5180

GREENSPAN, M. and THOMPSON, M. C., JR. An eleven megacycle interferometer for low pressure gases, 2294

GREENWALD, S. The antiferromagnetic structure deformations in CoO and MnTe, 8098

GREENWOOD, A. Pulse-free discharges in negative point-to-plane corona, 247. The mechanism of the ring discharge in negative point-to-plane corona, 1657. Negative point-to-plane corona; an exercise in the principle of similarity applied to gaseous discharges, 7695

GREENWOOD, H. H. Molecular orbital theory of reactivity in aromatic hydrocarbons, 361

GREENWOOD, J. N. Intercrystalline cracking of metals, 3664. Intercrystalline cracking of brass, 3665

GREENWOOD, N. N. *See also* ANDERSON, J. S., 2447

GREENWOOD, N. N. and MARTIN, R. L. A discussion on theory of liquids; discontinuities in the physical properties of supercooled liquids, 2242

GREER, B. A. *See* YAFFE, L., 5088

GREGG, D. E. *See* GILFORD, S. R., 8821

GREGG, E. C. *See* TUCKER, B. L., 445

GREGORY, C. Conservation of quanta for nonlocal fields, 3856. Construction of conservation equations for nonlocal field theories, 8216

GREGORY, T. M. *See* JOSIEN, M.-L., 2595

GREINER, C. New investigations on nuclei of reverse magnetization, 6958

GREINER, H. The light emitted from condensed vacuum sparks at high current densities, 7704

GREINER, J. Experiments on magnetic anisotropy in magnetic-recording tapes, 965

GREISEN, K. *See also* BARRETT, P. H., 1731

GREISEN, K. and WALKER, W. D. Ratio of neutral to charged particles in the nuclear interacting component of cosmic rays, 6121

GREMMELMAIER, R. and MADELUNG, O. Preparation of single crystals of semiconducting compounds of the type $A^{III}B^{V}$, 8051

GRENET, G. The characteristic data of electromagnetic seismographs, 5224

GRENIER-BESSON, M.-L. *See also* AMAT, G., 7581

GRENIER-BESSON, M. L. and AMAT, G. Measurement of band intensities of infra-red absorption in vibration-rotation spectra, 1529

GRENIER-BESSON, M. L., AMAT, G. and BARCHEWITZ, P. Contribution to the study of the vibration spectrum of nitrous oxide, 3138

GRENON, M. A study of the operation of external cathode counters: the influence of thermal treatment and the effect of water released from the glass, 6876

GREVE, L. DE. *See* DE GREVE, L.

GREW, K. E. and IBBS, T. L. Thermal diffusion in gases, 4648

GRIEGER, P. F. *See* WALL, F. T., 3006

GRIEM, H. *See* BURHORN, F., 8429

GRIFFIN, O. G. *See* GORDON, R. L., 4461

GRIFFITH, J. S. Note on the generalized free-electron model of conjugated polycyclic hydrocarbons, 3486

GRIFFITH, R. H. *See* CHAPLIN, R., 8412

GRIFFITH, W. and BRICKL, D. E. The diffraction of strong shock waves, 2265

GRIFFITHS, G. M. and WARREN, J. B. Relative pair production cross section at low energies, 3568

GRIFFITHS, H. D. Wave guide arrays with symmetrical conductance functions, 4926

GRIFFITHS, J. H. E. and OWEN, J. The nuclear spins of ^{99}Ru and ^{101}Ru, 2614

GRILLOT, E. *See also* BANCIE-GRILLOT, M., 8030

Grillot, E. and Guintini, P. Study of the infrared photoluminescence of copper-activated cadmium sulphide, 5403

Grilly, E. R. Relationships between transport properties of gases, 79. The liquefaction and storage of partially converted liquid hydrogen, 2422

Grimeland, B. Determination of the neutron spectrum by means of boron absorption, 7961

Grimley, T. B. The volume effect in polymer chains, 3517

Grimsdell, G. The characteristics of some miniature high-stability glow-discharge voltage regulator tubes, 874

Grisard, J. W. *See* Oliver, G. D., 3239

Grison, E. *See* Abrahams, S. C., 2824

Griswold, T. W., Kip, A. F. and Kittel, C. Microwave spin resonance absorption by conduction electrons in metallic sodium, 1602

Grivet, P. *See* Hubert, P., 4839

Grodzins, L. *See* Chang, W. Y., 2525

Groendijk, H. *See* Alma, G. A., 7712

Groeneveld, J. On the measurement and recording of short time intervals, 6505

Groenewold, H. J. Information in quantum measurements, 57

Groetzinger, G. *See* Schwed, P., 6158

Groh, H. J., Jr. The fluorescence of biacetyl vapor, 4028

Groh, H. J., Jr, Luckey, G. W. and Noyes, W. A., Jr. The mechanism of acetone vapor fluorescence, 2367

Gromov, K. and Dzhelepov, B. γ-ray spectrum from Cs^{134}, 7889

Groot, S. R. de. *See* de Groot, S. R.

Gros, C.-M. and Comsa, J. Influence of β-mercaptoethylamine and thymus extract on the survival of guinea-pigs irradiated with X-rays, 8151

Grosch, H. R. J. High speed arithmetic: the digital computer as a research tool, 3789

Groschwitz, E. Contributions to field-mechanics, 607

Grosjean, C. C. Note on the diffraction of light by a finite number of centres distributed at random, 2385. The theory of multiple scattering of particles emitted by a non-isotropic plane δ-source, 2951. Solution of the non-isotropic random flight problem in the k-dimensional space, 6490

Grosof, G. M. *See* Weinreich, G., 8641

Gross, E. F. and Karryev, N. A. Absorption of light by a cuprous oxide crystal in the infrared and visible spectra, 5389. Optical spectrum of overtone [electrons], 5390

Gross, E. F., Korshunov, A. V. and Selkin, V. A. Certain relationships in the spectra of combination scattering of low frequencies of isomorphous crystals of dihalogen substituted benzene, 3166

Gross, E. P. *See* von Hippel, A., 8397

Gross, K. A. Universal mountings for X-ray goniometers, 2815

Gross, N. and Lane, P. H. R. An accurate wire resistance method for the measurement of pulsating pressures, 2983

Gross, W. On the calculation of the electrostatic capacity of a conductor, 3281

Grossetti, E. On the mode of vibration of the surface of a piezoelectric quartz plate, 7530

Grossfield, K. A laboratory method for determining the angles subtended by distant objects, 162

Grossman, L. M. and Charwat, A. F. The measurement of turbulent velocity fluctuations by the method of electromagnetic induction, 1411

Grossweiner, L. I. *See also* Avery, E. C., 3175

Grossweiner, L. I. and Matheson, M. S. Luminescence of ice and tritiated ice, 146

Grotdal, T. *See* Trumpy, B., 1913

Groth, W. E. *See* Beckey, H. D., 1040

Grove-Palmer, C. O. J. *See* Senior, D. A., 1324

Groven, L. *See* Roy, R. R., 1682

Gruen, D. E. An interpretation of the visible and near-infrared spectra of NpO_2^+ and PuO_2^{++} ions, 1011

Gruenberg, H. Second-order beams of slotted wave guide arrays, 1784

Grümm, H. The self-charge broadening of a focused electron beam, 2481

Grummitt, W. E. *See* Morrison, J. L., 4452

Grunberg, L. The formation of hydrogen peroxide on fresh metal surfaces, 3690

Grunberg, L. and Wright, K. H. R. Russell effect
evaporated metal films, 575. Possible explanat
of the radioactivity induced by the detonation
shaped charges, 5699. Kramer and Russell eff
with single crystals of zinc, 8442

Grundland, I. Mass-spectrometric study of oxy
polymers present in ozonized oxygen (O_3 and
4942

Grunert, J. The effect of direct and reflected sound
the sound distribution in rooms, 95

Guastalla, L. Extension of the law of Traube-Ducl
to the absorption of saturated fatty acids on para
1228

Gubanov, A. I. Theory of solid rectifiers, 6
Dynamical theory of dry rectifiers. I. Limits
application of the static theory, 6785. Method
rapid determination of the temperature-conducti
coefficient of solids and liquids. Appendix, 680

Guber, W. The temperature dependence of the scat
ing cross section of bound protons for slow neutr
3599

Gubkin, S. I. and Dobrovol'skiĭ, S. I. Study of
chromatic lines in transparent models underg
finite plastic deformations, 7616

Gucker, F. T., Jr and Haag, R. M. The compre
bility of solutions. II. An ultrasonic study
aqueous solutions of some simple amino acids
their uncharged isomers at 25°c, 6534

Guében, G. Absorption in earth of γ-rays and neutr
5043

Guénard, P. and Huber, H. An experimental stud
the interaction by space-charge waves on an elect
beam moving in crossed electric and magnetic fie
4836

Guénoche, H. and Jouy, M. Stabilized cellular flan
7628

Guénoche, H. and Manson, N. On the variation of
velocity of explosive waves with tube-diameter,

Guernsey, G. *See also* Nelson, B. K., 433

Guernsey, G., Mott, G. and Nelson, B. K. Differe
n-p scattering cross section for 220-MeV neutr
455

Guernsey, G. L. *See* Mott, G. R., 454

Guest, P. G. On the standard errors in the fittin
polynomials to unequally spaced observations, 5

Guest, P. G. and Simmons, W. M. Fiduciary fringe
the Jamin refractometer, 3971. An experimen
cosmic rays, 5548

Guggenheim, E. A. Electron spin in semiconduct
8400

Guggenheim, E. A. and McGlashan, M. L. The d
mination of molecular weights of macromolec
from measurements of osmotic pressure, 4644

Guggenheim, E. A. and Pryce, M. H. L. Urani
graphite lattices, 4374

Guillaud, C. Antiferromagnetism of atoms
different crystallographic lattice sites, 319.
mentary mechanism of magnetization in m
oxides of iron and cobalt, 8574

Guillaud, C. and Sage, M. X-ray determinatio
the magnetostriction of mixed iron-cobalt ox
8603

Guillaume, J. *See* Chaume, G., 8830

Guillon, H. Method giving stability and equalit
intervals in a pulse-height selector, 6111

Guinier, A. X-ray crystallographic technology, 37

Guinier, A. and Sébilleau, F. Achromatic arrange
for the determination of X-ray line profiles, 125

Guintini, P. *See* Grillot, E., 5403

Gul', V. E. Effect of (inter)molecular attraction o
strength of high polymers with developed sp
structure, 8040

Gullikson, C. W. *See* Nielsen, J. R., 8337

Gulmanelli, P. *See* Caldirola, P., 7441

Gumbel, E. J. *See* Freudenthal, A. M., 4425

Gumowski, I. Summation of slowly converging s
7373

Gunn, J. B. Resistance of germanium contacts,
Radiative transitions in germanium, 6040. *See*
Blakemore, J. S., 8413

Gunn, J. C. Production and scattering of mesons,

Gunn, K. L. S. *See* Kerker, M., 5809; Marshall,
2571

Günner, K. von. *See* von Günner, K.

Gunnill, O. *See* Dickson, J. M., 1703

nning, H. E. *See* McDonald, C. C., 2629
nst, S. B. *See* Page, L. A., 4070
nther, M. The relativistic configuration space formulation of the multi-electron problem, 1376
nther, N. Studies in physiological optics, 1305; II, 2113; III, 5259; IV, 5260; V, 6340; VI, 8825; VII, 8826; VIII, 8827; IX, 8828
nther, S. Investigations on colour indices. III. A differential method for the determination of colour indices with Schmidt mirrors, 1345; IV. The short-wave colour brightness diagram of the Pleiades and Praesepe, 1346
pta, D. R. Das. *See* Das Gupta, D. R.
pta, M. K. Das. *See* Das Gupta, M. K.
pta, N. N. The optical principles of the low angle scattering of X-rays, 4133
pta, P. K. Sen. *See* Sen Gupta, P. K.
upta, S. C. Das. *See* Das Gupta, S. C.
upta, S. N. Quantum electrodynamics with auxiliary fields, 2946
uptill, E. W. An exact solution of the acoustical field near a circular transducer, 1458. The sound field of a piston source, 3047
urari, M. Self energy of slow electrons in polar materials, 4476
urevich, D. B. *See* Bobovich, Ya. S., 7593
urney, C. The effect of surface conditions on the strength of brittle materials, 4400
urney, I. D. C. Lattice sums: the validity of Evjen's method, 5211
urney, R. W. Lattice vibrations in graphite, 991. The scattering of slow neutrons in polycrystalline media, 1153
ürsey, F. Gravitation and cosmic expansion in conformal space-time, 4586
utbier, H. *See* Neuert, H., 1696
uth, E. *See* James, H. M., 6262. Sells, R. L., 8244
utin, L. Ya. On the theory of stable vibrations of an elastic semispace, 1440
utkin, N. G., Evstrop'ev, K. S. and Kuznetsov, A. Ya. The surface electric conductivity of glasses in damp atmosphere, 6034
utmann, F. *See also* Breyer, B., 8020
utmann, F. and Simmons, L. M. Further note on the temperature dependence of the viscosity of liquids, 7481
utowsky, H. S. *See also* McCall, D. W., 7040
utowsky, H. S. and Liehr, A. D. The infrared spectra of PF_3, POF_3, and PF_5, 136
utowsky, H. S., McCall, D. W., McGarvey, B. R. and Meyer, L. H. Electron distribution in molecules. I. F^{19} nuclear magnetic shielding and substituent effects in some benzene derivatives, 3699
Gutowsky, H. S., McCall, D. W. and Slichter, C. P. Nuclear magnetic resonance multiplets in liquids, 2617
Gutowsky, H. S. and McGarvey, B. R. Nuclear magnetic resonance in thallium compounds, 7041. Rb^{87} and Cs^{133} magnetic resonance shifts in the solid halides, 7795
Gutowsky, H. S., Meyer, L. H. and McClure, R. E. Apparatus for nuclear magnetic resonance, 8633
Güttinger, W. Quantum field theory in the light of distribution analysis, 2938
Güttler, A. The Mie theory of diffraction through dielectric spheres with absorbing cores and its application to problems of interstellar matter and of atmospheric aerosols, 2387
Guttman, L. *See* Stout, J. W., 839, 863
Guy, J. *See* Tillieu, J., 7851
Guy, R. On the solutions of the equation of evolution, 1372
Guy, W. *See* Towler, J. H., 1492
Guyomard, F. Determination of the local monochromatic absorption coefficient in "cracking" flames, 141
Guyton, A. C., Ritter, R. M. and Satterfield, J. H. Continuously recording radioactive hemoglobinometer, 1304
Gwinn, W. D. *See* Bohn, C. R., 4018

Haag, R. On the correspondence theory of the spin wave-equations, 616. On the objectivity of states in non-relativistic quantum theory, 4589
Haag, R. M. *See* Gucker, F. T., Jr, 6534
Haan, E. F. de. *See* de Haan, E. F.
Haar, D. ter. *See* ter Haar, D.
Haardick, H. The behaviour of light-sensitive evaporated layers in the electron microcope, 8716
Haas, L. L., Harvey, R. A. and Laughlin, J. S. Biological evaluation of skin effects of the 23 MeV betatron, 2861
Haas, N. de. *See* de Haas, N.
Haase, R. Limiting laws for an infinite dilution as a result of a universal theorem of concentrated mixtures, 8268
Haber-Schaim, U. and Yekutieli, G. On the production of κ-mesons, 1929
Habgood, H. W. *See* Weinberger, M. A., 3244
Hacobian, S. *See* Breyer, B., 527
Hacskaylo, M. and Otterson, D. On the presence of free sodium in sodium chloride crystals containing color centers and color center precursors, 3727
Haddara, S. R. and Jakeman, D. The lateral structure of cosmic ray extensive air showers at sea level, 6917
Hadden, R. J. B. The effect of surface treatment on electrical breakdown between copper electrodes at 50 cycles at very low pressures, 883
Hadley, C. P. Thermionic emission from oxide-coated tungsten filaments, 2519
Hadley, L. N. *See* Curtis, K. K., 694
Hadni, A. Band analysis of carbon disulphide in the gaseous phase, near 25 μ, with the aid of a registering grating spectrograph, 6636
Hadži, D. and Sheppard, N. The infra-red absorption bands associated with the COOH and COOD groups in dimeric carboxylic acids. I. The region from 1500 to 500 cm^{-1}, 3123
Haeberli, W., Huber, P. and Baldinger, E. Energy per ion pair of gases and gas mixtures for α-particles, 4885
Haefer, R. The breakdown voltages of gaseous discharges in transverse magnetic fields, for the pressure range 10 to 10^{-8} mm Hg, 5491
Haendler, H. M., Wheeler, C. M., Jr and Bernard, W. J. The transmittance of crystalline cadmium fluoride, 4023
Haenny, C. *See* Favre, R., 6883; Gailloud, M., 2884–5
Hafner, E. The complete system of electromagnetic normal modes of a biaxial anisotropic parallelepiped, 2559. On the determination of dielectric constants of optically uniaxial crystals from the characteristic spectrum of circular cylindrical cavity resonators, 5581. The complete system of electromagnetic resonances of uniaxial anisotropic crystal-loaded cavity resonators, 5582
Hafner, E. M., Hornyak, W. F., Falk, C. E., Snow, G. and Coor, T. The total *n-p* scattering cross section at 4·75 MeV, 1923
Hagedorn, R. A static model of $BaTiO_3$ at room temperature, 1617
Hagen, C. *See* Bailitis, E., 6157
Hagene, B. *See* Freymann, R., 5392
Hagenguth, J. H. and Anderson, J. G. Lightning to the Empire State Building. III, 1295
Hägg, G. and Karlsson, N. Aluminium monochromator with double curvature for high-intensity X-ray powder photographs, 7303
Hagihara, H. Surface roughening and oxidation of galena cleavage face in a vacuum furnace under limited air supply, 7193
Hagstrum, H. D. Electron ejection from Mo by He^{+}, He^{++}, and He$_2^{+}$, 1693. Electron ejection from Ra by He^{+}, He^{++}, and He$_2^{+}$, 7731
Hahn, B. Scintillations produced by alpha particles in CsI, 8339
Hahn, B., Baldinger, E. and Huber, P. Dependence of pair production cross-section on nuclear charge number for gamma-rays of Th(C + C^{11}), RaC and Co^{60}, 5046
Hahn, B. and Rossel, J. Scintillators of α-particles in CsI, 7601
Hahn, E. L. and Maxwell, D. E. Spin echo measurements of nuclear spin coupling in molecules, 1014
Hahn, M. *See* Lenz, F., 4842
Hahn, T. M. *See* Jenkins, G. L., 7899

Haigh, C. and McCulloch, R. K. Further determinations of the energy distribution of electrons in the positive columns of gas, 8435
Haiman, O. *See* Fenyves, E., 2521
Haine, M. E. and Hirst, W. The adaptation of an electron microscope for reflexion and some observations on image formation, 7719
Haine, M. E. and Mulvey, T. The formation of the diffraction image with electrons in the Gabor diffraction microscope, 262
Haines, H. R. *See* Mott, B. W., 4750
Haissinsky, M. and do Carmo Anta, M. Reduction of ceric salts and oxidation of ferrous sulphate by polonium α-particles, 5759
Haken, H. Treatment of a model of exchange interaction between an electron and a lattice oscillator [in metals], 8607
Hakoila, K. J. On the determination of the refractive index and the thickness of plane parallel plates with the help of optical interference, 4691
Halban, H. *See* Ambler, E., 5653; Bishop, G. R., 1896, 6214; Daniels, J. M., 1841; Grace, M. A., 4288; Marin, P., 7140
Halban, H. H. *See* Beghian, L. E., 7076
Hale, F. E. *See* Johnson, C. T., 6336
Hale, K. F. *See* Coyle, R. A., 5207
Hales, J. L. An optical system and thermopile amplifier for double-beam recording of infrared spectra, 3101
Hales, R. W. and Moyer, B. J. Atomic number dependence of neutral meson yield from proton bombardment, 3620
Haley, F. C. and Andrews, D. H. An anomalous critical current effect in superconducting NbN, 2468
Hälg, W. *See also* Adler, H., 8685; Eriksen, V. O., 7942
Hälg, W. and Jenny, L. On the fading effect in nuclear plates, 8161
Hall, G. G. The electronic structure of diamond, 5202
Hall, G. L. *See* Bachman, C. H., 4171
Hall, G. R. *See* Hurst, R., 5682
Hall, H. H. *See also* Hardy, H. C., 3059
Hall, H. H. and Powell, J. L. Scattering of protons by protons, 6097
Hall, H. O. Some observations on the crystallography of deformation twins, 8762
Hall, J. A. A portable wedge spectrograph for precision measurement, 6582
Hall, L. D. An analytical method of calculating variable diffusion coefficients, 2751
Hall, L. G. *See* Washburn, H. W., 5189
Hall, L. H. Attenuation of sound resulting from ionic relaxation, 683*. Longitudinal vibrations of a vertical column by the method of Laplace transform, 3890
Hall, N. A. Nonequilibrium thermodynamics, 6739
Hall, R. G. N. and Sayce, L. A. On the production of diffraction gratings. II. The generation of helical rulings and the preparation of plane gratings therefrom, 2389
Hall, R. N. *p-n* junctions produced by growth rate variation, 229
Hall, T. C., Jr and Blacet, F. E. Separation of the absorption spectra of NO_2 and N_2O_4 in the range of 2400–5000 Å, 750
Hall, W. C., Horton, B. M., Keller, J. W. and Liebson, S. H. A high-resolution detector for high-intensity radiation, 4159
Halla, F., Jagodzinski, H. and Ruston, W. R. One-dimensional disorder in dodecahydrotriphenylene, $C_{18}H_{24}$, 8056
Halliday, D. *See* Wheatley, J., 1096
Halpern, I. *See* Winhold, E. J., 447
Halpern, J., Mann, A. K. and Nathans, R. (γ, *pn*) reaction in phosphorus, 1129. A neutron detection system for use with pulsed accelerators, 1947
Halpern, J., Nathans, R. and Mann, A. K. Photon absorption cross sections in bismuth and tantalum, 1125
Halpern, J. and Weinstock, E. V. Photodisintegration of the deuteron at 20 MeV, 7932
Halpern, L. A relation between the Hall effect and the increase in the electrical resistance of bismuth at low temperatures, 4815
Halpern, O. Multiple scattering of neutro III. Scattering by spin-dependent forces and pola zation phenomena, 475. Remarks on some qu tions of neutron optics, 1157
Halpern, O. and Appleton, G. L. The scattering slow neutrons by O_2 molecules, 6243
Halpern, O. and Lippmann, B. A. The interferen of amplitudes in cascade processes, 394
Halsey, R. M. *See also* Chapanis, A., 2863
Halsey, R. M. and Chapanis, A. An experimen determination of some iso-chromaticity lines color-deficient vision, 572
Halstead, R. E. Atomic masses from palladi through xenon, 1041
Halteman, E. K., Mechlin, G. F. and Glick, H. Isothermal ordering of Cu_3Au at 200°c, 2753
Halter, J. B. *See* Woodward, J. G., 3036
Ham, A. C. and Jackson, L. C. Visual observations the formation of bulk liquid from the helium II fil 4765
Ham, J. S. A new electronic state in benzene, 4946. *also* McConnell, H., 2341
Hamann, S. D. A quantum correction to the Lenna Jones and Devonshire equation of state, 4659. *also* David, H. G., 1438
Hamann, S. D. and Pearse, J. F. The second vi coefficients of some organic molecules, 4660
Hamer, W. J. Fifty years of electrochemical theo 7238
Hamerling, T. *See* Aten, A. H. W., Jr, 3584
Hamermesh, B. *See also* Kimball, C., 5079
Hamermesh, B. and Hummel, V. Neutron capture γ- spectra from the elements $Z = 17$–30 and $Z = 45$ 1086
Hamermesh, B. and Kimball, C. The photodisinteg tion cross section of beryllium at 2·185 MeV, 62
Hamermesh, B., Ringo, G. R. and Wexler, S. thermal neutron capture cross section of hydrog 5083
Hamilton, J. Real and virtual processes in quant electrodynamics, 2187. Steady states and *S*-matrix, 3884. A step wedge for sensitometry v the electron microscope, 4415. Convergence in intermediate representation, 8218
Hamilton, J. G. *See* Garrison, W. M., 7119
Hamm, F. A. *See* Miller, L. E., 4104
Hammad, A. Calculation of the polarization of a su sky composed of pure air molecules, 3777
Hammerton, J. C. *See* Goulding, F. S., 7192
Hammick, D. L. *See* Foster, R., 1506
Hamming, R. W. *See* Bozorth, R. M., 2578
Hammond, W. R., Kundu, D. N. and Pool, M. Activity assignment to titanium 51, 4992
Hamon, B. V. and Meakins, R. J. Dielectric absorpt and d.c. conductivity in *n*-primary alcohols, 161
Hámos, L. von. *See* von Hámos, L.
Hampton, M. I. *See* Kerker, M., 4745
Hampton, W. M. Measurement of the volume of so of revolution, 2975
Hancock, G. J. The self-propulsion of microsc organisms through liquids, 3910
Hancock, N. H. *See* Charlesby, A., 7211
Hand, K. *See* Greenfield, M. A., 1675
Handel, J. van den. *See* van den Handel, J.
Handley, T. H. *See also* Cohen, B. L., 5701
Handley, T. H. and Olson, E. L. Dysprosium 157, 5
Hanks, P. A. *See* Fogg, P. G. T., 8289
Hanle, W. and Podzuweit, G. A new micropho controlled light flash stroboscope for the observa of vocal lip movements, 5935
Hanle, W. and Rau, K. H. Light yield and destruct of phosphors by electron and ion bombardm 1543
Hanle, W. and Riede, D. Excitation and ioniza functions for fast electron collisions, 4861
Hanle, W. and Scharmann, A. Polarization of fluo cence of dissociated molecules, 3153
Hanna, G. C. *See* English, W. N., 6902
Hanna, S. S. *See* Class, C. M., 3555; Fagg, L. W., 1 Gelinas, R. W., 2698
Hannan, R. B., Jr. *See* Miller, F. A., 2352
Hannan, R. S. and Shepherd, H. J. An after-effec butter-fat irradiated with high-energy electrons, 2
Hannay, N. B. *See* Ahearn, A. J., 1708
Hänni, F. *See* Albers-Schönberg, H., 5032

NNI, H. and Rossel, J. (n, α) and (n, p) reactions of iron with slow neutrons, 5077
NSEN, K. F. *See* Kiehn, R. M., 7152
NSEN, S. *See* Smith, H. M., 266
NSLER, R. L. and Oetjen, R. A. The infrared spectra of HCl, DCl, HBr, and NH_3 in the region from 40 to 140 microns, 7578
NSON, A. O. *See* Goldwasser, E. L., 902; Whalin, E. A., 2707
NSON, A. W. Improvements in optical Fourier synthesis, 1257. The optical derivation of structure amplitudes, 7317
NSON, A. W., Lipson, H. and Taylor, C. A. The application of the principles of physical optics to crystal-structure determination, 7316
NSON, H. P. Mixing of states and antiferromagnetism, 4205
NSON, R. E. *See* Prener, J. S., 4736
PP, W. W., Hull, T. E. and Morrish, A. H. A statistical analysis of grain counting in photographic emulsions, 8164
RA, O. and Shimazu, H. Remark on the self energy problem of the photon, 3866
RANG, L. and Landmark, B. Radio echoes observed during aurorae and terrestrial magnetic storms using 35 and 74 Mc/s waves simultaneously, 8814
RASIMA, A. Statistical mechanics of surface tension, 5890
ARDEBOL, J. *See* Van der Held, E. F. M., 6696
ARDEMAN, G. E. G. *See* Poulis, N. J., 6939
ARDEN, G. D. *See* Green, J. H. S., 3676
ARDING, T. T. *See* Wallwork, S. C., 1823
ARDY, A. V. Analyzing turbulence by means of photographs of airborne particles, 1284
ARDY, G. F. and Hulm, J. K. Superconducting silicides and germanides, 3316
ARDY, H. C. Unsolved basic physical research problems in the field of noise, 714. Tentative estimate of a hearing damage risk criterion for steady-state noise, 1314. Noise control measures for jet engine test installations, 5365. *See also* Callaway, D. B., 716
ARDY, H. C., Hall, H. H. and Ramer, L. G. Direct measurement of the efficiency of loud-speakers by the use of a reverberation room, 3059
ARGREAVES, M. E. *See* Clarebrough, L. M., 2767, 8722
ARIHARAN, T. A. On the Raman spectrum of solution of benzoyl chloride in benzene, 3168
ARING, H. G. *See* Gerding, H., 4728
ARKER, D. The meaning of the average of $|F|^{21}$ for large values of the interplanar spacing, 8788
ARKER, G. S. *See* Alluisi, E. A., 8148
ARLEY, J. *See* Fresco, J., 393
ARLEY, J. H. Sampling and measurement of airborne daughter products of radon, 8648. *See also* Alercio, J. S., 2664; Eisenbud, M., 5252
ÄRM, R. *See* Spitzer, L., Jr, 3231
ARMON, N. F. *See* Annis, M., 1932
ARNISCHMACHER, E. and Rawer, K. Long distance radiowave communication, 1297
ARPER, A. F. A. *See also* Wylie, R. G., 3018
ARPER, A. F. A. and Mortlock, A. J. The effect of centring errors on the transmission of a sector disk, 6590
ARPER, W. R. A modified ionization method of measuring contact potential, 4784. Surfaces showing no electrification after light contact with metals, 6748
ARPUR, W. W. and Ubbelohde, A. R. Electrical conductivity of caesium chloride near the thermal transition, 1631
ARRAND, M. Raman intensity and chemical structure, 4732
ARRAND, M. and Martin, H. Variation of the intensity of the Raman spectra with substitutions in the benzene nucleus and in the side-chain of cinnamyl chloride, 3165
ARRAP, B. S. and Manners, D. J. Molecular weight of glycogens determined by a light-scattering method, 519
ARRER, J. M. Reactor operation, 7945
ARRER, J. M., Boyar, R. E. and Krucoff, D. Transfer function of Argonne CP-2 reactor, 460
ARRICK, N. J., Barnes, R. G., Bray, P. J. and Ramsey, N. F. Nuclear radiofrequency spectra of D_2 and H_2 in intermediate and strong magnetic fields, 5655
Harrick, N. J. and Ramsey, N. F. Rotational magnetic moment, magnetic susceptibilities, and electron distribution in the hydrogen molecule, 369
Harries, W. L. and von Engel, A. A new electron multiplication process, 4128
Harrington, R. F. Current element near the edge of a conducting half-plane, 6964
Harrington, R. G. The 48-inch Schmidt-type telescope at Palomar observatory, 2903
Harrington, W. F. *See* Pickels, E. G., 2790
Harris, C. W. *See* Sells, R. L., 8244
Harris, E. G. and Melkanoff, M. A. The quadrupole moment of Li^7, 4965
Harris, F. B., Jr. *See* Escober, I. V., 6924
Harris, F. E. and Alder, B. J. Dielectric polarization in polar substances, 6030. Dielectric polarization and self-ionization in carboxylic acids, 7658. Intermolecular potentials from dielectric polarization in polar gases, 7819
Harris, G. G. and Shanley, T. J. B. The gamma-rays from negative μ-meson capture in lead, 3562
Harris, J. D. Pitch discrimination, 1313
Harris, J. D. and Rawnsley, A. I. Patterns of cochlear adaptation at three frequency regions, 6344
Harris, P. M. *See* Lindenmeyer, P. H., 3131
Harris, S. P., Muehlhause, C. O., Rose, D., Schroeder, H. P., Thomas, G. E., Jr and Wexler, S. Thermal neutron-proton capture, 7186*
Harris, T., Jr. *See* Canody, L. J., 2802
Harrison, A. J. *See* Tannenbaum, E., 2354
Harrison, E. R. Intense drying of gases with potassium metal, 3705
Harrison, F. B. *See* Cowan, C. L., Jr, 6108; Jackson, J. A., 2378
Harrison, G. E. and Seymour, F. D. The thermal neutron capture cross section of ^{84}Sr, 2718
Harrison, G. R., Archer, J. E. and Camus, J. A fixed-focus broad-range echelle spectrograph of high speed and resolving power, 109
Harrison, M. An experimental study of single bubble cavitation noise, 715
Harrison, M. A. and Geballe, R. Simultaneous measurement of ionization and attachment coefficients, 6897
Harrison, M. F. A. *See* Turnbull, A. H., 7266
Harrison, W. A check on the standard observer data at 4358 Å, 4749
Hart, A. *See* Bates, L. F., 8549
Hart, D. P. *See* Vajda, J., 6005
Hart, E. J. *See* Blomgren, R. A., 4298
Hart, E. W. A magnetic analog for the interaction of dislocation loops, 3649. The structure of deformation bands, 3659
Hart, J. C. *See* Davis, D. M., 2642
Hart, R. K. The thermal oxidation of tin, 2756
Hartert, E. and Glemser, O. On the positions of hydrogens in the lattices of crystalline hydroxides, 6313
Hartman, R. E., Green, T. D., Bateman, J. B., Senseney, C. A. and Hess, G. E. Preparation of uniformly dispersed specimens of particulate matter for electron microscopy, 2762
Hartree, D. R. Numerical analysis, 576
Harvey, J. A. Energy levels in lead and bismuth and nuclear shell structure, 2700. *See also* Hughes, D. J., 5724
Harvey, R. A. *See* Haas, L. L., 2861
Hashimoto, H. *See* Tanaka, K., 8445
Hashimoto, Y. and Mori, I. Ultra-violet papyrography: an automatic analytical apparatus using filter paper without a colour reagent, 2040
Hashitsume, N. A statistical theory of linear dissipative systems, 8243
Hasimoto, Z. On the limiting line in a simple wave, 3928. A note on cross Mach lines in simple waves in the plane supersonic flow, 3931. Plane jet of gas emitted from a nozzle with supersonic velocity, 5902
Haskin, D. M. *See* Schein, M., 7909
Haskins, J. R. *See also* Elliott, M. W., 403
Haskins, J. R., Duval, J. E., Cheng, L. S. and Kurbatov, J. D. Radioactivity of scandium 43, 1075
Haskins, J. R. and Kurbatov, J. D. The disintegration of I^{131}, 1056
Haslam, R. N. H. *See also* Horsley, R. J., 4524; Summers-Gill, R. G., 2708; Taylor, J. G. V., 446

Haslam, R. N. H., Cameron, A. G. W., Cooke, J. A. and Crosby, E. H. Alpha particles from the photodisintegration of silver and bromine, 7925
Haslam, R. N. H., Horsley, R. J., Johns, H. E. and Robinson, L. B. Measurement of nuclear gamma-ray absorption in carbon, 5042
Haslam, R. N. H., Katz, L., Crosby, E. H., Summers-Gill, R. G. and Cameron, A. G. W. Cross section for the reaction Be$^9(\gamma, p)$Li^8, 2706
Hasler, M. F. Relative speeds of Raman spectrometers, 7554
Hassion, F. X. and Cole, R. H. Dielectric relaxation processes in ethanol, 8391
Hastings, A. E. and Meade, J. E. A device for computing correlation functions, 5
Hastings, J. *See* Weiss, R. J., 1269
Hastings, J. A. *See* Bush, V., 8353
Hastings, J. M. *See also* Corliss, L. M., 6134
Hastings, J. M. and Corliss, L. M. Neutron diffraction studies of zinc ferrite and nickel ferrite, 8526
Hatakeyama, H. Present status of research on radio-meteorology in Japan, 1300
Hatanaka, T. and Moriyama, F. A note on the long-period variation in the radio-frequency radiation from the quiet sun, 7397
Hatcher, J. B. *See* Westrum, E. F., Jr, 3273
Hatfield, M. R. *See* Dahlquist, C. A., 4429
Hatfield, P. An ultrasonic phase lag method for measuring the thickness of rubber, 59. *See also* Patton, R. G., 3065
Hatfield, P., Emerton, H. W. and Wrist, P. E. Re-suspension of Dow latex '580*G*' by ultrasonics, 2029
Hatton, J. *See* Croft, A. J., 4105
Haufe, G. *See* Recknagel, A., 1681
Hauffe, H., Glang, R. and Engell, H.-J. Effect of the electronic disorder in oxidic catalysts on the rate of decomposition of nitrous oxide, 6285
Hauffe, K. The mechanism of oxidation of metals and alloys at high temperature, 3637
Hauffe, K. and Flindt, H. G. On the electrical conductivity and thermoelectric power of nickel sulphide, 848
Hauffe, K. and Peters, H. Conductivity measurements on the system Bi$_2$O$_3$–CdO, 6035
Haug, A. The role of the requirement of outgoing radiation for a complex wave number and its significance for the surface wave problem, 979
Haug, P. *See* Kortüm, G., 8324
Haugsnes, J. *See* Darlington, L. E., 6231
Haupt, G. W. An alkaline solution of potassium chromate as a transmittancy standard in the ultraviolet, 2359. *See also* Davis, R., 3197
Hauptman, H. *See also* Karle, J., 2817, 8090
Hauptman, H. and Karle, J. The probability distribution of the magnitude of a structure factor. II. The non-centrosymmetric crystal, 2818. Locating the principal maxima of a Fourier series, 8089
Hause, C. D. *See* Clark, R. J., 5979
Hauser, U. H. Neutron detection with boron trimethyl and investigation of the B$^{10}(n, \alpha)$Li^7 reaction, 3600
Hausman, H. J. *See also* Arthur, J. S., 1834; Bender, R. S., 270
Hausman, H. J., Allen, A. J., Arthur, J. S., Bender, R. S. and McDole, C. J. Energy levels in magnesium, vanadium, chromium, and manganese, 1835
Hausser, K. H. and Wegner, U. On the dependence of the molecular quantum absorption on the light intensity in photochemical processes, 1220
Hautot, A. and Falla, L. On the mode of action of desensitizers. VII, 2121
Hautot, A. and Sauvenier, H. On the mode of action of desensitizers. III–IV, 2119; V–VI, 212 VIII, 5266; IX, 6351
Havas, P. Conservation laws for fields of zero r II, 30. On the creation of pairs of particles in the collision processes between particles of spin $\hbar/2$, 1383. The classical equations of motion of point particles. II, 7461. *See also* McLennan, J. A., Jr, 29; Mehl, C. R., 8698
Havelock, T. H. The moment of a submerged solid of revolution moving horizontally, 650
Havemann, R. and Rausch, W. Kinetics of the formation of methaemoglobin azide, 6284. The absorption spectrum of methaemoglobinazide in the 2300 to 1200 Å region, 6628
Havemann, R. and Wolf, P. Absorption spectra methaemoglobin and its fluorides, rhodanid cyanides and nitrites, 5954
Haven, Y. Dielectric losses of sodium chloride crysta 3293
Haven, Y. and van Santen, J. H. On pre-exponent factors in formulae for ionic conductivity in soli 1633
Havens, W. W., Jr. *See* Block, M. M., 1908; Bramso H. J., 472; Durbin, R. P., 471; Goodell, W. Jr, 2692; Passman, S., 1909
Hawkings, R. C. *See also* Bartholomew, R. M., 50 5091
Hawkings, R. C., Merritt, W. F. and Craven, J. The maintenance of radioactive standards with 4π proportional counter, 3539
Hawkins, G. S. *See* Almond, M., 7394
Hawkins, J. A., Polo, S. R. and Wilson, M. K. N on the vibrational spectra of SiHCl$_3$, SiH$_2$Cl$_2$, a SiH$_2$Br$_2$, 6623
Hawkins, J. A. and Wilson, M. K. The infrared a Raman spectra of SiH$_2$Cl$_2$, 2343
Hawkins, P. O. Microwave phenomena in gases, 12
Hawksley, P. G. W. Automatic particle-sizing by s cessive countings, 2225
Haxel, O. A simple method of measuring the rad active substances contained in the air, 8646
Hay, H. G. and Unwin, R. S. Tropospheric wa propagation in a duct of non-uniform height, 257
Hayashi, C. Forced oscillations with nonlinear storing force, 3447. Subharmonic oscillations nonlinear systems, 5336
Hayashi, C. and Munakata, Y. On a relativistic tegral equation for bound states, 2944
Hayashi, I. and Ôno, K. Fine and hyper-fine struct of paramagnetic resonance spectra in several dilu manganese salts, 8567
Hayashi, M. Absorption spectrum of cuprous oxide the visible region, 3127
Hayashi, M. and Katsuki, K. Hydrogen-like abso tion spectrum of cuprous oxide, 1512
Hayashi, T., Ishizaki, Y. and Kumabe, I. The half- of ThC′, 1865
Hayden, R. J. *See* Karraker, D. G., 395
Haydon, S. C. *See* Dutton, J., 6063, 6812
Hayes, F. N. *See also* Cowan, C. L., Jr, 6108
Hayes, F. N. and Gould, R. G. Liquid scintillat counting of tritium-labeled water and organic co pounds, 6885
Hayes, M. E. *See* Cole, D. P., 924
Haymond, H. R. *See* Garrison, W. M., 7119
Haynam, G. E. *See* Crouch, M. F., 3381
Haynes, J. R. and Hornbeck, J. A. Temporary tra in silicon and germanium, 4803
Haynes, S. K. *See* Broyles, C. D., 2677
Haywood, R. W. The thermodynamic properties saturated water, 3280
Hazard, C. *See* Brown, R. H., 7393
Hazard, D. M. Aircraft engine noise control as view by the engine manufacturer, 5363
Hazel, J. F. and Schnable, G. L. Streaming poten measurements and the adhesion of phosphors cathode ray screens, 3162
Hazen, T. Synthetic plastic insulation, 828
Hazen, W. E. *See* Heineman, R. E., 4897
Head, A. K. The interaction of dislocations and bo daries, 4480. The growth of fatigue cracks, 80 *See also* Bullen, F. P., 4426
Heal, H. G. The decomposition of solid potassi perchlorate by 50 kilovolt X-rays, 5172
Heal, H. T. *See* Gillam, E., 528
Healy, J. W. Measurement of natural radioacti background, 1049
P, C. N. *See* Ewles, J., 4721
Heaps, H. S. and Herzberg, G. Intensity distribut in the rotation-vibration spectrum of the OH mo cule, 738
Heaps, S. N. *See* Clewell, D. H., 7341
Hearmon, R. F. S. 'Third-order' elastic coefficie 7990
Heath, G. A. *See* Sharbaugh, A. H., 2347
Heath, H. R. The viscosity of gas mixtures, 6536
Heath, R. L. *K*-shell conversion coefficient of Ce 422

avens, O. S. The contamination in evaporated films by the material of the source, 484. Application of multiple-beam interferometry to the study of surface polish, 1559. Surface layer on crystalline quartz, 8764. *See also* Collins, L. E., 1239; Ditchburn, R. W., 1357

avens, O. S. and Collins, L. E. Epitaxis in polycrystalline films, 5770

ber, G. Quantum theory of a new origin of ferromagnetism (preliminary communication), 1741. The structure of the ferromagnetic state in α-iron and some iron alloys, 1742

bert, J. Study of the heavy primaries in the cosmic radiation, 3406

ck, P. H. and Van Horn, W. The surface tension of liquid silicon and germanium, 7490

ddle, T. A. On the temperature sensitivity of special magnetic materials, 7793

edeman, E. R. *See* Dodson, H. W., 3809

dgcock, F. T. *See* Misenfr, A. D., 7479

edges, J. M. and Mitchell, J. W. Some experiments on photographic sensitivity, 3780. The observation of polyhedral sub-structures in crystals of silver bromide, 6354

edgran, A. *See* Lindström, G., 4323; Mladjenovič, M., 5028

edrick, L. C. Microwave frequency standard, 8584

edvall, J. A., Brisi, C. and Lindner, R. Self-diffusion in mono-calcium ferrite, 4402

edvall, J. A. and Carlander, O. Some contributions to the question of crystallographic transition and crystal cracking, 5203

ée, A. *See also* Lecolazet, R., 5251

ée, A. and Lecolazet, R. Interpretation and utilization of the measurement of the penetrating radiation of rocks on the surface, 5231

Heel, A. C. S. van. *See* van Heel, A. C. S.

Heer, C. V. *See also* Nicol, J., 2423

Heer, C. V., Barnes, C. B. and Daunt, J. G. Magnetic refrigerator for maintaining temperatures below 1°K, 8377

Heer, C. V. and Rauch, C. Magnetic susceptibility of colored potassium chloride from 1°K to 300°K, 4903

Heer, E. The influence of external fields on angular correlation, 7092. *See also* Albers-Schönberg, H., 5032, 7103

Heerden, I. J. van. *See* Van Heerden, I. J.

Heerschap, M. *See* Stoker, P. H., 7088

Heidel, R. H. *See* Huke, F. B., 4724

Heidenreich, R. D. Methods in electron microscopy of solids, 1183. *See also* Nesbitt, E. A., 8556

Heidmann, J. The interaction of nucleons of some hundreds of MeV with nucleons and nuclei, 5301. The interaction of π-mesons of the order of a hundred MeV with nucleons and nuclei, 8672

Heikes, R. R. *See* Zener, C., 8521

Heilpern, W. The effect of added nitrogen on the absorption of light by oxygen as a function of the pressure, 6643

Hein, R. A. *See* Steele, M. C., 237

Hein, R. E. *See* McFarland, R. H., 5052

Heine, T. H. *See* Meister, G., 3339

Heineman, R. E. and Hazen, W. E. The density distribution within two meters of large air shower axes, 4897

Heinemann, E. The use of phase contrast to make visible secondary interference in the diffraction of light by ultrasonic waves, 163. Accuracy of spherometer measurements, 4628. The use of optical diffraction of divergent light by ultrasonic waves for demonstrating the angular dependence of diffraction of light by ultrasonic waves, 4743

Heinz, C. *See* Geerk, J., 4869

Heisenberg, W. Meson production as a shock wave problem, 1942

Heitz, M. P. *See* Winans, J. G., 352

Held, E. F. M. van der. *See* Van der Held, E. F. M.

Helfer, H. L. Magneto-hydrodynamic shock waves, 3799

Hellawell, A. *See* Axon, H. J., 8071

Heller, L. The structure of dicalcium silicate α-hydrate, 7334

Heller, R. *See* Simonds, J. L., 2291; Slonczewski, J. C., 3915*

Heller, W. R. *See* Dexter, D. L., 7292

Hellgren, G. The propagation of electromagnetic waves along a conical helix with variable pitch, 4927

Hellgren, G. and Meos, J. Localization of aurorae with 10 m high power radar technique, using a rotating antenna, 4519

Hellstrand, E. *See also* von Dardel, G., 3363

Hellstrand, E. and Persson, R. Studies of the resonance absorption of neutrons in uranium with the time-of-flight method, 2717

Hellund, E. J. The decay of resonance radiation by spontaneous emission, 3528. Inner bremsstrahlung and the magnetic moment of the neutrino, 6211

Hellwege, A.-M. and Hellwege, K.-H. Vibrational structure of electronic transitions in single crystals of praseodymium and neodymium salts, 1516. The splitting of $\mathrm{P_r}^{+++}$ terms and the symmetry of the crystal field in trigonal single crystals of praseodymium salts, 6625

Hellwege, K.-H. *See* Hellwege, A.-M., 1516, 6625

Helmcke, J.-G. Data on the pore system of a membrane filter, 5734

Helwig, G. Electrical conducting and structure of sputtered cadmium oxide layers, 224

Hély, J. On the dynamics of a spinning point particle, 4600

Hemily, P. Crystal structure of soda with seven molecules of water, 5218

Hemptinne, M. de. *See* de Hemptinne, M.

Henderson, C., Heymann, F. F. and Jennings, R. E. Phase stability of the microtron, 3346

Henderson, J. C. *See* Tillman, J. R., 7673

Henderson, J. W. *See* Marx, J. W., 216

Henderson, S. T. and Waigh, D. T. The colour-rendering properties of fluorescent lamps and a proposed new method of specification, 5430

Henderson, W. J. *See* Kyles, J., 7090

Hénin, S. and Le Borgne, E. Causes of the magnetic properties of certain soils, 5792

Henisch, H. K. *See* Banbury, P. C., 6978

Henke, B. and DuMond, J. W. M. Low-angle X-ray diffraction with long wavelengths, 5206

Henkels, H. W. and Maczuk, J. Electrical properties of liquid selenium. I, 7691

Henley, E. M. *See also* Drell, S. D., 630

Henley, E. M. and Ruderman, M. A. Recoil effects in meson-nucleon scattering, 5858

Hennig, G., Lees, R. and Matheson, M. S. The decomposition of nitrate crystals by ionizing radiations, 4450

Henry, L. Measurement of the refractive index of amorphous selenium between 5 and 15 μ, 7547

Henry, N. F. M. and Lonsdale, K. [Eds.]. International tables for X-ray crystallography, Volume I. Symmetry groups, 8064

Henry, W. E. The anomalous paramagnetism of copper sulfate pentahydrate, 324. Spin paramagnetism of Cr^{+++}, Fe^{+++}, and Gd^{+++} at liquid helium temperatures and in strong magnetic fields, 970. Magnetic saturation and apparent molecular fields of $\mathrm{MnCl_2 . 4H_2O}$, 4915. Some magnetization studies of Cr^{+++}, Fe^{+++}, Gd^{+++} and Cu^{++} at low temperatures and in strong magnetic fields, 8560

Henry, W. G. and Raynor, G. V. Superlattice studies in the systems silver-magnesium-tin and silver-magnesium-zinc, 7326

Henshaw, D. G. *See* Jackson, L. C., 4061

Hensley, E. B. On the electrical properties of porous semiconductors, 222. A study of the electrical properties of porous semiconductors, 4089

Henson, A. F. The measurement of radioactive carbon in gas counters, 6878

Hepburn, F. and Pierce, E. T. Atmospherics with very low-frequency components, 7806

Herbert, R. J. T. Discrimination against noise in scintillation counters, 278

Herbig, G. H. Discussion of some new results on H-poor, C-rich stars, 6437

Herbst, W. and Philipp, K. The path of an atomic explosion aerosol, 7362. Reply to "The path of an atomic explosion aerosol"

Herdan, G. Heisenberg's uncertainty relation as a case of stochastic dependence, 635

Hereford, F. L. and Keuper, J. P. The azimuthal distribution of photoelectrons produced by 0·5-MeV polarized photons, 6229

Herforth, L. and Krumbiegel, J. Some observations on cadmium sulphide crystals, 8758
Heric, E. L. *See* Pace, E. L., 6737
Herlin, M. A. *See* Mayper, V., Jr, 3259
Herman, F. Electronic structure of the diamond crystal, 2057
Herman, F. and Callaway, J. Electronic structure of the germanium crystal, 3475
Herman, L. *See also* Weniger, C., 1495
Herman, L. and Herman, R. A light source which emits a continuous spectrum, 5382
Herman, R. *See* Barrow, R. F., 3992; Herman, L., 5382
Herman, R. C. and Shuler, K. E. Intensities of vibration-rotation bands, 4254
Hermans, J. J. and Ullman, R. The statistics of stiff chains, with applications to light scattering, 2799
Hermida, S. Velayos. *See* Velayos Hermida, S.
Hernegger, F. *See* Brukl, A., 399
Herpin, A. Interionic forces in metals, 7813. *See also* Dufour, C., 8450
Herr, W. Assignment of mass-number 188 to the 18-min nuclear isomer of Re by chemical means, 3572. A simple radiometric procedure for the determination of the isotopic composition of lithium salts, 8645. *See also* Flammersfeld, A., 2654
Herreng, P. Measurement of the mobility of electrons in oxygen and of their probability of fixation on the molecules of this gas, 935
Herrey, E. M. J. Approximate formula for the radiation resistance of a piston set in an infinite wall, 3057
Herrick, C. E., Jr. The sensitometry of the positive diazotype process, 2124
Herrick, J. F. Temperatures produced in tissues by ultrasound: experimental study using various technics, 2275
Herrick, J. F. and Krusen, F. H. Certain physiologic and pathologic effects of microwaves, 5814
Herrick, S. Tables for rocket and comet orbits, 6499
Herrmann, J. and Sexl, T. On the quantitative theory of radioactive α-emission, 5010
Herschman, A. *See* Hull, M. H., Jr, 4614
Hersh, H. N. The Kirkendall effect in alloy systems, 480
Hershberger, W. D. and Leifer, H. N. Paramagnetic resonance in phosphors, 972. Paramagnetic resonance in phosphors at microwave frequencies, 8564
Hertel, P., Jr, Straiton, A. W. and Tolbert, C. W. Dielectric constant measurements at 8·6-mm wavelength, 7660
Hertog, H. *See* Jenckel, E., 7209
Hertz, C. H. A ferromagnetic scaling circuit, 284
Herz, A. J. *See also* Tidman, D. A., 5717
Herz, A. J. and Edgar, M. The reduction of distortion in nuclear-research emulsion, 4549
Herz, A. J., Hodgson, P. E. and Tennent, R. M. The production of τ-mesons in ice, 4380
Herzberg, G. Forbidden transitions in the spectra of diatomic molecules, 3112. Forbidden transitions in diatomic molecules. III. New ${}^1\Sigma_u^- \leftarrow {}^3\Sigma_g^-$ and ${}^3\Delta_u \leftarrow {}^3\Sigma_g^-$ absorption bands of the oxygen molecule, 4948. *See also* Heaps, H. S., 738
Herzberg, L. *See* Locke, J. L., 4569
Herzfeld, K. F. *See* Schwartz, R. N., 348; Sponer, H., 1813
Herzog, L. F. *See* Aldrich, L. T., 2630
Herzog, R. F. K. On a new mass spectrograph with anastigmatic image, 4870
Hess, D. N. *See* Skraba, W. J., 8026
Hess, G. E. *See* Hartman, R. E., 2762
Hess, P. N. *See* Jones, H. L., 1303
Hess, V. F. *See* Parkinson, W. D., 277
Heumann, T. Evaluation of diffusion coefficients for single-phase and multi-phase diffusion in solid alloys, 6246. Relation between the partial and the collective diffusion coefficients in metallic mixed crystals, 6248
Hewitt, W. H. *See* Mason, W. P., 3470
Heydenburg, N. P. *See* Talbott, F. L., 4346
Heyland, G. R. and Duncanson, W. E. A search for irregularities in the absorption of cosmic rays in lead, 3412. Momentum distribution for cosmic ray mesons up to 6 kMeV/c, 3413
Heymann, F. F. *See* Henderson, C., 3346
Heywang, W. The character of the higher transition BaTiO$_3$, 5455
Hibbard, L. U. *See also* Caro, D. E., 1770, 8453
Hibbard, L. U. and Caro, D. E. Instantaneo measurement of a varying frequency, 91
Hibberd, F. H. Theoretical resonance curves in th gyro-interaction of electromagnetic waves in th ionosphere, 8596
Hibdon, C. T. and Muehlhause, C. O. Internal co version of neutron capture γ-rays, 1092
Hiby, J. W. and Pahl, M. The influence of bina collisions on molecular [Knudsen] gas flow, 8 The influence of binary collisions on molecul [Knudsen] gas flow. I. Long tube of circul section, 81. II. Gap between parallel plates; ci cular hole; short tube; porous medium, 82
Hickam, W. M. *See* Fox, R. E., 2510
Hickman, K. C. D. Studies in high vacuum evapor tion. Surface behavior in the pot still, 3022
Hickman, K. C. D. and Trevoy, D. J. Studies in hig vacuum evaporation. The falling-stream tens meter, 3020. Comparison of high vacuum stills an tensimeters, 3023
Hicks, B. L. *See also* Turner, T. E., 4016
Hicks, B. L., Turner, T. E. and Widule, W. W. App cations of large digital computers to calculations microwave spectroscopy, 3997
Hicks, D., Husain, T., Sanders, L. G. and Beghia L. E. Levels in N^{14} from the C^{13} (p, γ) N^{14} reactio 5058
Hicks, D. A. *See* Schecter, L., 5065
Hida, K. On the subsonic flow of a compressible flu past a prolate spheroid, 3929*
Hideshima, T. *See* Iwayanagi, S., 6265
Hiedemann, E. and Spence, R. D. Towards a unifor theory of relaxation phenomena, 1985
Hiessberger, F. and Karlik, B. Further experimen on the astatine isotope 218, 5006
Higashi, A. On the thermal conductivity of soil, 239 Thermal conductivity of frozen soil, 3229
Higatsberger, M. J. Experimental investigations wi an "impulse mass-spectrograph," 6094
Higgs, P. W. An application of perturbation theory the *F* and *G* matrix method of calculating molecul vibration frequencies, 7002. Vibrational modific tions of the electron distribution in molecul crystals. I. The density in a vibrating carbon ato 7289. A method for computing zero-point energie 7823
Hilbert, H. *See* Brukl, A., 399
Hilborn, J. W. *See* Eichholz, G. G., 5187
Hildebrand, J. H. and Scott, R. L. The entropy solution of nonelectrolytes, 66
Hildebrand, R. H. Neutral meson production in *n* collisions, 3621. A convenient assembly for Čere kov counters using head-on type photomultipli tubes, 6888
Hill, A. V. The Brownian fluctuations of a couple galvanometer system, 3296. *See also* Copeland, K 3295
Hill, D. L. and Wheeler, J. A. Nuclear constitutio and the interpretation of fission phenomena, 3522
Hill, H. *See* Bell, R. M., 5463
Hill, J. F. The approach to criticality of a cylindric pile, 5092. One and two group theory of cylindric piles, 5093
Hill, J. J. and Aron, J. An investigation of the thermo luminescence of fluorite colored by X-ray irradia tion, 2369
Hill, N. E. Dielectric relaxation time of polar molecul in solution, 7651
Hill, R. D. Dependence of gamma-radiation lifetim on nucleon configurations, 1862. Auger electro intensities, 8669. *See also* Goldhaber, M., 102 Swan, J. B., 1055, 4306, 7901
Hill, R. D., Church, E. L. and Mihelich, J. W. Th determination of gamma-ray energies from beta-ra spectroscopy and a table of critical X-ray absorptio energies, 414
Hill, R. D. and Mihelich, J. W. The probable existenc of an $E3 + M4$ mixture in an isomeric transitio 2669
Hill, R. W. Elastic scattering of alpha-particles b carbon, 6225. Apparatus for low temperatu calorimetry, 8367. *See also* Jackson, H. L., 2688

, R. W. and Smith, P. L. The anomalous specific heat of ferrous ammonium sulphate, 3270. The specific heat of beryllium at low temperatures, 7633
, T. L. Adsorption on proteins and interactions between protein molecules in solution, 8041
, V. J. *See* Day, M. K. B., 1261
enbrand, L. J., Jr and Kilpatrick, M. L. The thermal decomposition of nitromethane, 3678
son, P. J. and Rideal, E. The Bequerel effect in the presence of dyestuffs and the action of light on dyes, 4103
pold, R. On the determination of the light-sensitivity of negative material for picture-making exposures, 6353
pan, J. On a new thermal equation of state for gases and fluids, 821. A new thermal equation of state. III, 4778
Lew. The ground state hyperfine structure and nuclear magnetic moment of praseodymium, 2621. The hyperfine structure and nuclear moments of Pr^{141}, 7829
Lew and Wessel, G. The hyperfine structure of the $3p\,^2P_{\frac{1}{2}}$ state of Al^{27}, 4286
cks, E. P. *See* Bell, W. E., 1936
dman, J. V. *See* Christiansen, W. N., 8
e, M. G. N. *See* Adams, J. B., 6857
es, C. O. Relativity and indeterminacy, 596. Generalized magneto-hydrodynamic formulae, 4919. Reflection of waves from varying media, 7805. Wave hypothesis of moving irregularities in the ionosphere, 8125
es, H. M. and Randall, J. E. Possible industrial hazards in the use of microwave radiation, 1317
schberger, G., Stirling, A. and Ambrosino, G. Experimental relation between the range in air and the range in emulsions of α-particles of energy less than 5 MeV, 7084
teregger, H. Induction phenomena due to the motion of matter in primary magnetic fields and the possibility of their experimental application. I. Experimental foundation, 6963
teregger, H. E. and Watanabe, K. Photoelectric cells for the vacuum ultraviolet, 6796
tz, N. M. and Ramsey, N. F. Excitation functions to 100 MeV, 434
pel, A. von. *See* von Hippel, A.
akawa, K. and Okada, T. On the dielectric properties of tungsten trioxide, 207
one, T. and Adachi, K. On the changes of electrical properties in cold-worked metal, 4110
one, T., Watanabe, H., Iwata, T. and Ikeda, K. On the a.c. magnetization characteristics of a Perminvar wire, 1763
ota, K. and Kobayashi, Y. On Drickamer's modification of the theory of the thermal diffusion column, 2252
sh, I. J. *See* Benson, R. W., 5354
sch, P. B. *See* Gay, P., 4400
schfelder, J. O. *See* Hornig, J. F., 992
st, F. Angular distribution of α-particles from the $Li^7(p, \alpha)He^4$ reaction at low proton bombarding energies, 430
st, W. *See* Haine, M. E., 7719
t, R. C. and King, F. T. Search for weak absorption bands of benzonitrile in the near ultraviolet, 746
r, R. C. and Salley, D. J. Ultraviolet absorption spectra of derivatives of symmetric triazine. I. Amino triazines, 6630
take, K. and Matsuda, K. A study on diffusion pump oil by the mass spectrometer and the gas analysis of the final vacuum, 6538
hcock, A. J. M. Pairing energy in the *j–j* coupling model, 7837
chfeld, W. *See* Marshall, J. S., 2571
mair, O. The directional correlations for inelastic scattering with subsequent gamma-radiation, 417. On inelastic scattering in the continuum theory, 418. On interference effects at angular correlation, 1885. On the determination of the nuclear spin from inelastic scattering, 4967. The statistical model and angular distributions, 7029. The geometry of the angular distribution of nuclear reactions, 7121. Differential and total cross-sections for inelastic scattering in the continuum theory, 7123
Hjalmar, E. and Slätis, H. *Q* values for the $N^{14}(\alpha, p)O^{17}$ reaction, 4345
Hlavatý, V. The Schrödinger final affine field laws, 2926. The spinor connection in the unified Einstein theory of relativity, 8202. Connections between Einstein's two unified theories of relativity, 8203
Hoang, T. F. On the production of mesons in very high energy nucleon-nucleon collisions, 7950. *See also* Dilworth, C., 7120
Hoard, J. L. *See* Kokes, R. J., 656
Hoare, D. E. and Walsh, A. D. Effect of water vapour on explosions of carbon monoxide, 1208. The inhibiting effect of lead tetraethyl. II. The effect of lead monoxide on the slow oxidation of methane, 2800
Hoare, F. E. [Conf. rep.]. Physics of the solid state, Physical Society spring meeting, 6981
Hoare, F. E., Kouvelites, J. S. and Matthews, J. C. Magnetic susceptibilities of palladium-rhodium alloys from 20° to 300°K, 956
Hoare, F. E., Matthews, J. C. and Walling, J. C. The thermal and magnetic properties of palladium-silver alloys, 4064
Hobbins, P. C. *See* Craig, D. P., 4711
Hobson, J. P. and Nierenberg, W. A. The statistics of a two-dimensional hexagonal net, 3716
Hobson, R. M. *See* Sloane, R. H., 8481
Hochanadel, C. J. and Ghormley, J. A. A calorimetric calibration of gamma-ray actinometers, 7253
Hock, R. J. Modification of the Scholander plastic semi-microrespirometer for use with larger animals, 6337
Hodge, P. G., Jr. The Brownian motion of coupled systems, 58
Hodgson, E. R., Gallagher, J. F. and Bowey, E. M. Neutron total cross sections, 2720
Hodgson, P. E. The energy distribution of alpha-particles emitted from nuclear disintegrations, 946. Nuclear disintegrations caused by 50–125 MeV protons. I, 8680. *See also* Herz. A. J., 4380; Tidman, D. A., 1733
Hodkinson, J. R. Coincidence and overlap errors in the automatic counting and sizing of particles, 3896
Hodson, A. L. Some aspects of the altitude variation of extensive air showers, 3409. Penetrating particles in extensive air showers, 3410
Hoerner, S. von. *See* von Hoerner, S.
Hoerni, J. and Wooster, W. A. The interpretation of diffuse X-ray reflexions from single crystals. II, 8082
Hofer, L. J. E. *See* Cohn, E. M., 2777
Hoffleit, D. Bibliography on meteoritic dust with brief abstracts (Including compilation by the late Willard J. Fisher), 3801
Hoffman, C. W. W. and Livingston, R. L. The molecular structure of carbon tetrafluoride, 4268
Hoffman, J. D. and Luborsky, F. E. Molecular and ionic interactions in dielectrics, 828
Hoffman, R. E. The self-diffusion of liquid mercury, 64
Hoffman, R. E. and Turnbull, D. Effect of impurities on the self-diffusion of silver, 1960
Hoffman, R. W. *See also* Crittenden, E. C., Jr, 8544
Hoffman, R. W., Anders, F. J. and Crittenden, E. C., Jr. Evidence for collapse of lattice vacancy aggregates to form dislocation rings, 3724
Hoffmann, B. The energy momentum tensor in Dirac's new electromagnetic theory, 1768. The relativity of size, 2169. The similarity theory of relativity and the Dirac–Schrödinger theory of electrons, 2170; II, 7420
Hofmann, J. A. and Strauch, K. On the interaction of 95-MeV protons with D, Li, Be, C, Al, Cu and Pb nuclei, 5059
Hoffmann, T. A. Some investigations in the field of the theory of solids. III. Plane and space lattice of similar atoms, 1797; IV. A-B-type ordered binary systems in the plane and the space, 1798; V. Adsorption. Surface states, 2032
Hoffmann, W. *See* Chomse, H., 8333
Hoffmeister, C. Investigations on bright night sky and luminous bands, 3778. Atmospheric turbidity and a twilight anomaly, 8129
Hofstadter, R. *See also* Hudson, A., 947; Kantz, A., 2495

Hofstadter, R., Fechter, H. R. and McIntyre, J. A. Scattering of high-energy electrons and the method of nuclear recoil, 7722

Hogan, C. L. The ferromagnetic Faraday effect at microwave frequencies and its applications, 8598

Hogarth, C. A. Transistor action in lead telluride, 2456. Transistor action and related phenomena in lead sulphide specimens from various sources, 4098

Hogarth, J. E. and McCrea, W. H. The relativistically rigid rod, 1361

Hogg, B. G. *See also* Geiger, J. S., 2632

Hogg, B. G. and Duckworth, H. E. Some atomic masses for tellurium, 7052. A mass spectrographic determination of the decay energies of Rh^{102} and Rh^{104}, 7053

Hogg, D. C. The electromagnetic field in the plane of a circular aperture due to incident spherical waves, 2563

Hogrebe, K. Neutron production in lead by cosmic rays, 3418

Hok Ong Ping. *See* Ong Ping Hok.

Holden, A. N. A spiral scanning X-ray reflection goniometer for the rapid determination of preferred orientations, 2816

Holden, J. Plastic deformation features on cleavage surface of metal crystals, 1164

Holl, W. *See* Mühleisen, R., 4516

Holland, L. The structure of evaporated metal films, 142. The effect of vapor incidence on the structure of evaporated aluminum films, 5126

Hollander, J. M., Perlman, I. and Seaborg, G. T. Table of isotopes, 7061

Hollenberg, J. L. *See* Bohn, C. R., 4018

Hollingsworth, C. A. Solutions of some problems concerning long random coils, 370. Equilibrium and the rate laws, 505

Hollis-Hallett, A. C. Experiments with a rotating cylinder viscometer in liquid helium II, 8374

Hollomon, J. H. and Turnbull, D. Nucleation, 3714

Hollway, D. L. The optimum space-charge-controlled focus of an electron beam, 261. A decimal counter electron tube, 3385

Hollyer, R. N., Jr, Hunting, A. C., Laporte, O. and Turner, E. B. Luminosity generated by shock waves, 3946

Holm, R. J. *See also* Weber, D., 762

Holm, R. J., Weber, D. and Penner, S. S. Emissivity for CO_2 at elevated pressures, 722

Holmberg, B. A remark on the uniqueness of the potential determined from the asymptotic phase, 7464

Holmberg, E. R. R. A suggested explanation of the present value of the velocity of rotation of the earth, 7409

Holmes, J. R. *See* Parker, L. W., 2333, 4294

Holmgren, H. D. *See* Brown, R. J. S., 272

Holshouser, D. F. *See* Babcock, M. L., 8475

Holstein, T. Optical and infrared reflectivity of metals at low temperatures, 1556

Holt, A. S. *See* Rabinowitch, E., 1513

Holt, J. R. and Marsham, T. N. The deuteron stripping reaction with aluminium, 1113. States of S^{33} and Si^{29} from (d, p) stripping, 3591. An investigation of (d, p) stripping reactions. I. Apparatus and results for aluminium, 3592; II. Results for the isotopes of magnesium, 3593; III. Results for ^{28}Si and ^{32}S, 7126; IV. Results for ^{40}Ca and ^{88}Sr, 7127

Holt, N. *See also* Bogaardt, M., 7160

Holt, N. and Bogaardt, M. Investigation of the condition of the hydrogen filled TPA ionisation chambers, 7739

Holt, N. and Klepp, H. Report on calculations of the neutron flux distribution in the reactor tank, the reflectors and the thermal column of the uranium pile at Kjeller, 7161

Holt, N., Klepp, H. and Steenberg, K. Report on the first running-up of the nuclear reactor at Kjeller, using two auxiliary BF_3-counters in connection with a 100 mC Ra-Be neutron source, 7163

Holt, N. and Lundby, A. Photo-neutrons in heavy water from uranium fission products, 5710

Holte, G. On the slowing down of neutrons in heavy water, 5114

Holtebekk, T., Isachsen, N. and Sörensen, S. O. The determination of the mass of energetic helium isotopes emitted in nuclear explosions, 7907

Holter, N. J. and Glasscock, W. R. Tracing nucle explosions, 569. Vibrations of evaporating liqu drops, 670

Holton, G. Introduction to concepts and theories physical science, 3843

Holtzberg, F., Post, B. and Fankuchen, I. The crys structure of formic acid, 2836

Holyk, W. K. *See* Aldrich, L. T., 2630

Holzapfel, L. and Gleitsmann, G. Detection in and glasses of resonance frequencies dependent the material, 5909

Holzman, G. R. and Moore, K. H. An electron diff tion study of the reorientation of certain al halides deposited on mica and on mica surfa covered by organic films, 5200

Honda, K. and Satô, M. The effect of transformat pressure on latent heat of fusion of metals, 15 The effect of transformation pressure on the differe of specific volumes in liquid and solid states of me at melting points, 1578. An interpretation hysteresis loops in A_3 and A_4 transformations pure iron, 1579

Honda, S. On the characteristics of miscellane piezoelectric vibrators in stiffness control, 1461

Honig, R. E. On the molecular evaporation of gr IVB elements, 5524

Honjo, G. Electron diffraction studies on oxide fi formed on metals and alloys. II. Selective oxida of alloys, 1977

Hönl, H. On Mach's principle, 2924

Hönl, H. and Maue, A.-W. The unicity of the solu in the exact theory of diffraction, 331

Honl, H. and Zimmer, E. Intensity and polarizatio the diffraction of electromagnetic waves by a slit 8589

Honnell, P. M. Anomalous transient response crystal pick-up, 6566

Hoogschagen, J. *See* Bokhoven, C., 3014

Hooley, J. G. *See* Smith, J. G., 7194

Hooper, J. E. The intensity of the photon compone 70 000 feet altitude, 7762

Hoople, G. D. Unsolved problems relating to hea loss in industry, 1316

Hooven, F. *See* Clark, L. C., Jr, 2107

Hope, J. The tensor force interaction between a closed except for a single vacancy and an exte nucleon, 3521

Hopkins, H. H. The wave aberration associated skew rays, 2314. Phase structures seen in ordinary microscope, 3214. On the diffrac theory of optical images, 4688. A note on the th of phase-contrast images, 5990

Hopkins, N. J. Isomeric levels in Pb^{201} and Pb^{202}, *See also* Green, D. T., 7117

Hoppe, W. *See* Caimann, V., 6374

Hopper, H. G. *See* Galt, J. K., 8575

Hopper, V. D. and Wilson, A. R. W. A metho obtaining long exposures at high altitudes rubber balloons, 8810

Höppler, F. On a new measurement of the viscos water, 2227

Horak, H. G. The transfer of radiation by an em atmosphere, 3840

Horan, J. R. Non-uniform track shrinkage in nu emulsions, 7369

Hori, J. On phase-microscopic images. (Ge theory), 2396. *See also* Hori, T., 2397

Hori, S. On the concept of the free field, 23. O well-ordered *S*-matrix, 2952

Hori, T. and Hori, J. On the modified form of p contrast microscope, 2397

Horiuchi, K. Surface wave propagation over a c conductor with small cylindrical curvatu direction of travel, 7800

Horn, F. H. Spiral growth on graphite, 1241. dislocations, etch figures and holes, 2052

Horn, W. Van. *See* Van Horn, W.

Hornbeck, J. A. *See* Haynes, J. R., 4803

Horne, M. R. Model to illustrate the behaviour o base portal frames in the plastic range, 3656

Hornig, D. F. *See* Greene, E. F., 3945. Plumb, 4253

Hornig, J. F. and Hirschfelder, J. O. Londo persion forces between unlike molecules, 992

AUTHOR INDEX

nig, J. F., Levey, G. and Willard, J. E. Reactions of methane with iodine activated by radiative neutron capture, 515

nyak, W. F. *See* Hafner, E. M., 1923

owitz, J. Contribution of nuclear radiation to the continuous γ-spectrum accompanying β-activity, 1073. *See also* Abragam, A., 967; Yvon, J., 8561

owitz, M., Silvidi, A. A., Malaker, S. F. and Daunt, J. G. The specific heat of lead in the temperature range 1°K to 75°K, 815

sley, R. *See* Wiles, D. R., 3608

sley, R. J. *See also* Haslam, R. N. H., 5042

sley, R. J., Johns, H. E. and Haslam, R. N. H. Energy absorption in human tissue by nuclear processes with high-energy X-rays, 4524

st, H. Ven. *See* Ven Horst, H.

st, D. T. J. ter. *See* ter Horst, D. T. J.

ton, B. M. *See* Hall, W. C., 4159

ton, C. W. On the diffraction of a plane sound wave by a paraboloid of revolution. II, 5927

ton, G. K. *See also* Sharp, R. T., 4590

ton, G. K. and Sharp, R. T. Approximate wave functions for unbound relativistic particles in a Coulomb field, 2947

ton, J. P. The effect of intermolecular bond strength on the onset of cavitation, 5322

váth, J. I. On the calculation of the polarization energy of halogen-hydrogen molecules, 351. On the numerical computation of polarization energy, 2586

semann, R. and Bagchi, S. N. Calculation of electron-density distribution in crystals with the help of convolution operations, 5781. Proof of the existence of an unambiguous Röntgen structure analysis by folding [Entfaltung]. I. Folding of centrosymmetrical finite mass distributions, 7310. Crystal structure analysis giving unique determinations. II. The separation of the Q_0 function, 8076. The calculation of the Q_0 function from the experimentally determined intensity distribution of a bounded crystal, 8077

shino, R. *See* Shinohara, S., 3305

sler, W. R. *See* Breckenridge, R. G., 2453, 8414

tten, B. W. and Birdsall, D. H. Fine structure and rheological properties of lithium soap-oil dispersions, 3691

tz, H. P. *See* Porter, F. T., 3556

ude, A. L. *See* Brock, E. G., 2517

udlemont, E. and Rudiger, O. Proof of metallurgical transformations with the needle counter, 801

ugh, J. M. *See* Palmer, L. S., 1607

ugh, P. V. C. Radial oscillations in the cyclotron, 2497

ughton, H. G. The solar constant, 5241

use, A. S. and Fairbanks, G. The influence of consonant environment upon the secondary acoustical characteristics of vowels, 2299

uston, J. M. The slope of logarithmic plots of the Fowler–Nordheim equation, 884. *See also* Burgess, R. E., 4832

uston, W. V. The temperature dependence of electrical resistance, 1644. The principles of quantum mechanics, 3852

utermans, F. G. *See also* Begemann, F., 1047; Brix, P., 1499

utermans, F. G., Meyer–Schützmeister, L. and Vincent, D. H. Absolute calibrations of high-energy β-emitters with the 4π-counter, 4973

utgraaf, H. *See* Gerding, H., 4727

utman, J. *See* Botden, P. J. M., 3344

ve, L. Van. *See* Van Hove, L.

vorka, F. *See* Dietrick, H., 5749–50; Yeager, E., 5747-8

ward, B. E. Hydrodynamic properties of an electron gas, 4071

ward, J. N. and Chapman, R. M. Near-infrared absorption by entire bands of carbon dioxide, 759

ward, J. N. and Shaw, J. H. The ozone band at 1110 cm^{-1}, 4019

ward, L. N. and Smart, J. S. The specific heat discontinuity in antiferromagnets and ferrites, 6942

ward-Flanders, P. A versatile focusing system for Van de Graaff accelerating tubes, 1688

warth, D. J. and Sondheimer, E. H. The theory of electronic conduction in polar semi-conductors, 6781

Howarth, M. E. F. Colour matching filters for Macbeth illuminometer, 2307

Howe, H. A., and MacKenzie, K. R. Positron-electron scattering at 1·3 MeV, 4857

Howe, R. M. Probe studies of energy distributions and radial potential variations in a low pressure mercury arc, 6820

Howell, H. G. The laws of friction, 3670. The visible emission spectrum of Cl_2^+, 6616

Howell, W. D. *See* Bartholomew, R. M., 7062

Howerton, H. K. *See* Bergstralh, T. A., 6859

Howlett, B. W. *See* Dumbleton, M. J., 1988

Hoyle, F. Cosmic origin of radiation at radio frequencies, 8186

Hoyle, G. *See* Bradshaw, F. J., 4404

Hoyt, H. C. *See also* Muller, D. E., 1084

Hoyt, H. C. and DuMond, J. W. M. Gamma-radiation following decay of I^{131}, 8665

Hoyt, H. C., Murray, J. J. and DuMond, J. W. M. Comparison of gamma-ray reflections from the (550) and (310) planes of quartz, 5038

Hsiao, C. A. and Telegdi, V. L. The mechanism of the reaction $O^{16} + h\nu \rightarrow 4He^4$, 5707

Hsiao, C. C. Effect of orientation on the ultimate strength of linear high polymers, 492

Hsiao, C. C. and Sauer, J. A. Effect of biaxial orientation on the ultimate strength and crazing of linear polymers, 7998

Hu, J.-H. *See* White, D., 6983

Huang, K. On the zitterbewegung of the Dirac electron, 614

Huang, S.-S. The variational method for problems of neutron diffusion and of radiative transfer, 477. Some formulae for the emergent intensities by the Laplace transformation, 3830. The variational method for problems of radiative transfer. I. Isotropic scattering with a constant net flux, 3837; II. The formation of absorption lines in the Milne–Eddington model, 3838; III. Reflection effect, 3839. On the absorption lines formed in stellar atmospheres, 7405

Huang, S.-S. and Struve, O. The curve of line-width correlation and Doppler velocities in stellar atmospheres. I. Delta Canis Majoris, 3834

Hubbard, D. *See* Goldman, R. G., 2787

Hubbard, H. H. *See also* Regier, A. A., 5362

Hubbard, H. H. and Lassiter, L. W. Experimental studies of jet noise, 5359

Hubbard, J. C. *See* Sette, D., 1457

Hubbard, W. M. *See* Adams, E., 320

Huber, H. *See* Guénard, P., 4836

Huber, P. *See* Adler, H., 8685; Baumgartner, E., 8705; Haeberli, W., 4885; Hahn, B., 5046

Hubert, P. On the use of the properties of the caustic in magnetic lens spectrometers, 4854. *See also* Marty, N., 4989; Sakai, M., 4990

Hubert, P., Grivet, P. and Seiden, J. Annular correction of a magnetic lens, 4839

Huby, R. The theory of the deuteron stripping reaction, 2696

Huddleston, C. M. and Mitchell, A. C. G. Nuclear spectra of Rb^{82} and Rb^{84}, 1880

Hudson, A. and Hofstadter, R. Energy loss of cosmic ray mu-mesons in sodium iodide crystals, 947

Hudson, A. M. *See* Allred, J. C., 1114

Hudson, G. E. Trend analysis of physical data, 5268. *See also* Neuringer, J. L., 671

Hudson, R. L. *See* Foner, S. N., 7629

Hudson, R. P. Properties of the Cr^{+++} ion in the paramagnetic alums at low temperatures, 971. *See also* de Klerk, D., 2421, 3251, 6949, 8376

Huerta, F. Rotating-crystal methods, 4483

Hueter, T. F. A temperature invariant impedance point in the frequency response of circular barium titanate transducers, 3058

Hufford, G. A. A note on wave propagation through an inhomogeneous medium, 3457

Hug–Bousser, F. *See* Jauneau, L., 1103

Hugenholtz, N. M. On tops rising by friction, 2215

Huggins, W. H. A phase-principle for complex-frequency analysis and its implications in auditory theory, 712

Hughes, D. J. The reactor as a neutron source, 4372. *See also* Levin, J. S. 8690

Hughes, D. J., Harvey, J. A., Goldberg, M. D. and Stafne, M. J. The neutron-electron interaction, 5724
Hughes, F. J. *See* Jensen, E. N., 4999
Hughes, J. R. *See* Lane, T. B., 1200
Hughes, J. V. Possible motions of a sphere suspended on a string (the simple pendulum), 2218. The definitions of magnetic flux density and field intensity, 2555
Hughes, J. W. *See* Eastabrook, J. N., 8472
Hughes, R. C. and Coppola, P. P. Conductivity of oxide emitters, 295. Bariated tungsten emitters, 296
Hughes, R. H. The microwave spectrum and structure of ozone, 5957
Hughes, V. *See also* Perl, W., 3532, 7847
Hughes, V., Tucker, G., Rhoderick, E. and Weinreich, G. The magnetic moment of the helium atom in the metastable triplet state, 7846
Hughes, V. and Weinreich, G. Effect of nuclear structure on the hyperfine structure of He^3, 8642
Hughes, V. W. *See* Weinreich, G., 8641
Hughes, W. and Taylor, C. A. Apparatus used in the development of optical-diffraction methods for the solution of problems in X-ray analysis, 5209
Hugo, T. J. *See* Naudé, S. M., 4698
Huizenga, J. R. *See also* Duffield, R. B., 3598; Engelkemeir, D. W., 4305; Wagner, F., Jr, 2656
Huizenga, J. R. and Duffield, R. B. Fission-to-capture cross section ratio, 1136
Huke, F. B., Heidel, R. H. and Fassel, V. A. Measurement of fluorescent spectra of liquids with a modified Beckman DU spectrophotometer, 4724
Hukuda, K. *See* Miduno, Z., 1451–2; Yasunaga, T., 1450
Hulbert, E. O. Explanation of the brightness and color of the sky, particularly the twilight sky, 2852. *See also* Beck, C. J., 6332
Huldt, E. *See* Barrow, R. F., 3992
Hulet, E. K., Thompson, S. G. and Ghiorso, A. Spontaneous fission rate of Cf^{246}, 3547
Hull, H. H. The band viscometer, 3901
Hull, H. L. Remote control engineering. An introduction, 2634
Hull, M. H., Jr. *See also* Breit, G., 2958; Gluckstern, R. L., 6073, 6074
Hull, M. H., Jr and Herschman, A. Effect of a short range repulsion on low energy singlet nucleon-nucleon scattering, 4614
Hull, T. E. *See* Happ, W. W., 8164
Hulm, J. K. Thermal resistivity of mercury in the intermediate state, 6062. *See also* Gomer, R., 236; Hardy, G. F., 3316; Matthias, B. T., 2467
Hulthén, L. and Nagel, B. C. H. The photodisintegration of the deuteron, 4359
Hum, D. M. *See* Bell, D. G., 4241
Humbach, W. Contributions to the isotope shift effect in the atomic spectra of the heavy elements, 4702
Humbel, F. Jona, F. and Scherrer, P. Anisotropy of the dielectric constant of ice, 4789
Hume-Rothery, W. Metallic carbides and nitrides of the type MX, 8795. *See also* Axon, H. J., 8071
Hume-Rothery, W., Christian, J. W. and Pearson, W. B. Metallurgical equilibrium diagrams, 482
Hummel, R. W. and Spinks, J. W. T. Betatron irradiation of aqueous ferrous sulphate solutions, 5174
Hummel, V. *See* Hamermesh, B., 1086
Humphrey, J. N., Lummis, F. L. and Scanlon, W. W. Capacitance effects in thin conductive films, 4093
Humphreys, C. J. *See also* Benedict, W. S., 3113
Humphreys, C. J. and Kostkowski, H. J. Infrared spectra of noble gases (12 000 to 19 000 Å), 2330
Humphreys, H. W. *See* Rouse, H., 6705
Hunaerts, J. Interpretation of the emission spectrum of OH from comets, 6409
Hund, A. Short-wave radiation phenomena. Volumes I and II, 980
Hung, C. S. *See also* Baum, R. M., 223
Hung, C. S., Hunt, B. and Winkel, P. Transport phenomena of liquid helium II in narrow slits, 2416
Hunger, K. *See* Diercks, H., 5841
Hunt, B. *See* Hung, C. S., 2416
Hunt, K. L. Collective electron ferromagnetism: a generalization of the treatment and an analysis of experimental results, 3426
Hunt, R. A. and Schuler, R. H. Saturation in t X-ray coloration of corundum single crystals, 3726
Hunt, R. W. G. Colour kinematography and t human eye, 2889. The perception of color in fields for different states of adaptation, 5817
Hunt, S. E. The absolute determination of resona energies for radiative capture of protons by berylliu in the energy range below 520 keV, 432. So absolute determinations of proton-gamma reso ances in the energy range below 500 keV, 2687
Hunt, S. E. and Jones, W. M. The absolute determi tion of resonant energies for the radiative capture protons by boron, carbon, fluorine, magnesium, a aluminium in the energy range below 500 ke 4349
Hunten, D. M. A rapid-scanning auroral spectromet 6603
Hunter, L. P. Current carrier mobility ratio in se conductors, 7670
Hunter, S. C. *See* Cottrell, A. H., 8612
Hunting, A. C. *See* Hollyer, R. N., Jr, 3946
Huntington, H. B. Extension of Makinson's theory photoelectric emission to a periodic potential, 245
Huntington, H. B. and Apker, L. Transition pro bility for photoelectric emission from semicond tors, 2449
Hurley, A. C. The molecular orbital theory of chem valency. XIII. Orbital wave functions for exci states of a homonuclear diatomic molecule, 42 XV. Illustrative calculations of the properties polar bonds, 7013
Hurley, A. C. and Lennard-Jones, J. The molecu orbital theory of chemical valency. XII. excited states of diatomic molecules, 35 XIV. Paired electrons in the presence of two unh attracting centres, 7012
Hurley, P. M. and Fairbairn, H. W. Alpha-radiat damage in zircon, 2828
Hurst, C. A. An example of a divergent perturbat expansion in field theory, 1391
Hurst, D. G. *See* Brockhouse, B. N., 1154
Hurst, G. S. *See also* Bortner, T. E., 5009
Hurst, G. S. and Ritchie, R. H. On energy resolut with proportional counters, 8467
Hurst, R. and Hall, G. R. Precision counting of al particles with special reference to the determinat of standard sources, 5682
Hurtubise, F. G. *See* Darwent, B. de B., 733
Hurvich, L. M. *See also* Jameson, D., 8144
Hurvich, L. M. and Jameson, D. Spectral sensitivit the fovea. I. Neutral adaptation, 5818
Husain, T. *See* Beghian, L. E., 7076; Hicks, D., 50
Hush, N. S. Reduction potentials and unsaturat energy changes in electrode reactions leading to formation of acridyl radicals, 512
Husson, R. Experimental study of the acoustic phy logical and psychophysiological conditions of mus taste, 5262
Huster, E. β-decay and the binding-energy of atomic electrons; the primary spectrum of R 6205. *See also* Bähnisch, I., 1058
Hutchinson, D. R. and Wiedenbeck, M. L. investigation of the radioactivity of Sb^{124}, 1083
Hutchinson, G. W. Applications of kicksorters, 41
Hutchinson, T. S. *See* Reekie, J., 6250; Thewlis 8782
Hutchison, C. A., Jr and Noble, G. A. Paramagn resonance absorption in additively colored crys of alkali halides, 323
Hutchison, C. A., Jr and Pastor, R. C. Paran netic resonance absorption in solutions of K liquid NH$_3$, 8563
Hutchison, C. A., Jr and Singer, L. S. Paramagn resonance absorption in salts of V and Mn, 1752
Hutchison, D. A. *See* Smaller, B., 356
Hutchison, T. S. X-ray line broadening from preci tion in Cu-Fe alloys, 7201
Huth, J. H. Thermal stresses in a partially clam elastic half-plane, 1400
Huus, T. *See also* Beckman, O., 7917
Huus, T. and Day, R. B. The gamma radiation f B^{11} bombarded by protons, 7898
Huxley, H. E. Optimum geometric conditions in design and use of X-ray diffraction tubes cameras, 8073

ley, L. G. H. Alternative developments of the theory of radio wave interaction, 6975. *See also* Crompton, R. W., 6901
brechts, M. and Schönberg, M. Ionization at relativistic energies and polarization effects, 8451
skens, P. *See* Mund, W., 5182
ng Jenn Lin. *See* Jenn Lin Hwang
e, E. K. and Ghiorso, A. The alpha-branching of AcK and the presence of astatine in nature, 4308
e, J. C. *See* Sheffer, H., 3186
ek, J. A. Unusual aerial phenomena, 4508
ek, J. A. [Ed.]. Astrophysics: a topical symposium, 3795

ioto, H. *See* Itoh, J., 379*, 6139, 6140, 7038
, T. L. *See* Grew, K. E., 4648
him, A. A. K. On the rigidity of elasto-viscous liquids, 5145. On the relation between dynamic viscosity and rigidity, 7482
him, A. A. K. and Kabiel, A. M. On the oscillating cylinder viscometer. I, 60, 8253
jō, B. On the new method of measuring dielectric constant and loss angles of semiconductors, 6032
ki, S. K. *See* LaRiviere, P. D., 1078
shima, I. *See* Mizushima, S.-I., 7258; Nakagawa, I., 1016
K. *See* Nishimura, J., 305
ashi, J. and Koyasu, M. Acoustical properties of trumpets, 2284
rashi, Y. *See* Yoshida, S., 6090
G. J., Clarke, D. D. and Eisberg, R. M. Statistical fluctuations in ionization by 31·5-MeV protons, 3388
ka, Y. Technique for testing the piezoelectric properties of crystals, 8393
da, K. *See* Hirone, T., 1763
da, M. On the approximate solutions of the unified field theory of Einstein and Schrödinger, 17
da, Y. On Verwey-Overbeek's theory of the interaction force between two colloidal particles, 2026
gawa, T. *See* Okada, J., 842
berry, E. *See* Besdin, D. J., 7787
ngworth, C. R. The laminar boundary layer of a rotating body of revolution, 7508
hner, M. *See* Schubert, K., 8097
khin, N. V. and Naurits, L. N. An experimental investigation of a temperature recorder of the through-flow type in a high-speed gas stream, 6013
, I. Discontinuous potential flow as the limiting form of the viscous flow for vanishing viscosity, 5881. On the asymptotic behaviour of compressible fluid flow at a great distance from a cylinder in the absence of circulation, 7507
, T. *See* Amakasu, K., 3399*
mura, T. *See* Utiyama, R., 2945
l, E. K. *See also* Salmon, A. J., 3594
l, E. K. and Boyle, A. J. F. Low intensity lines in the spectrum of the gamma-rays from ^{7}Li($p\gamma$)^{8}Be(α)^{4}He, 8679
omi, T. H. *See* Benton, A., 1597
, C. R. S. Atomic clocks and frequency stabilization, 2162
k, A. D. *See* Sutton, P. P., 8154
rd, U. A review of the influence of meteorological conditions on sound propagation, 5341. *See also* Kuckes, A. F., 6569
rden, R. S. Equations of motion and field equations in five-dimensional unified relativity theory, 7416
lstam, E. Analysis by phase contrast of the simple and complex periodicities of gratings, 3221. Application of phase contrast to the determination of small differences of refractive index in liquids, 3222. Application of variable contrast methods to the study of aerodynamic fields, 3223. A phase contrast refractometer with high accuracy for gases and liquids, 3972
lstam, E. and Djurle, E. Phase contrast measurements of the ruling structure of optical gratings. II, 5424. The study of diffraction grating characteristics by simplified phase contrast methods, 6674
rslev, F. Measurement of linear and non-linear distortion in electrodynamic loudspeakers, 7531
rsoll, L. R. and James, W. L. The Faraday effect in deuterium and certain other gases, 1792. A sensitive photoelectric method for measuring the Faraday effect, 2576
Ingham, J. *See* Gibson, R., 4632
Inghram, M. G. *See also* Chupka, W. A., 3275, 7644; Karraker, D. G., 395
Inghram, M. G. and Chupka, W. A. Surface ionization source using multiple filaments, 6866
Ingle, G. W. and Rudick, L. A comparison of the MacAdam and the Adams–Nickerson indexes of color differences, 5986
Ingleton, A. W. The Lorentz transformation, 4587
Inglis, D. R. The energy levels and the structure of light nuclei, 6169
Ingold, K. U. and Lossing, F. P. The rate of combination of methyl radicals, 4442. Free radicals by mass spectrometry. IV. The rate of combination of methyl radicals, 8008
Ingraham, L. Conformal relativity, 7414
Ingraham, R. L. Conformal relativity, 3848. Spinor relativity, 7415
Ingram, D. J. E. Paramagnetic resonance in some manganese salts, 6135. Paramagnetic resonance in manganese formate, 6137. *See also* Bleaney, B., 2544
Ingram, M., Adams, M., Coonan, L., Jespersen, J., Nielsen, G., Piatt, D. and Yettewich, G. The occurrence of lymphocytes with bilobed nuclei in cyclotron personnel, 2868
Inn, E. C. Y. *See* Watanabe, K., 1497, 1535, 5236, 5963
Innes, F. R. Matrix elements of spin-spin interaction, 6479
Innes, K. K., Cross, P. C. and Bair E. J. The asymmetric rotor. XI. Hydrogen sulphide absorption in the regions 8700 cm^{-1} and 11 000 cm^{-1}, 3496
Ino, T. An electron diffraction camera with a rotating sector, 2088
Inönü, E. and Wigner, E. P. Representations of the Galilei group, 7465
Inoue, K. *See* Muto, T., 2954
Inoue, N. Application of gasdynamical method to soil mechanics and theory of plasticity. I, 1956; II, 1957
Inoue, T. Heat transfer in liquid helium II through an extremely fine slit, 7637. *See also* Muto, T., 2954
Ionov, N. I. Measurement of the energy of electrons and of positive ions in a gas discharge, 7693
Inskeep, R. G. *See* Crawford, B. L., Jr, 4249
Inuishi, Y. On the temperature dependence of contact noise, 8417
Ioffe, A. F. *See* Ioffe, A. V., 5992
Ioffe, A. V. and Ioffe, A. F. A simple method of measuring thermal conductivity, 5992
Ioffe, B. and Rudik, A. On the decay of the π-meson, 5099
Ioffe, B. L. and Pomeranchuk, I. Ya. On the electrons produced in the capture of μ^--mesons into atomic levels, 3567
Ioffe, B. L. and Rudik, A. P. On the interaction of π-mesons with nucleons, 2956
Ioffe, B. L., Rudik, A. P. and Shmushkevich, I. M. The production of γ-quanta and neutral mesons in the capture of π^--mesons by deuterons. I, 3612; II, 3613
Ioffe, B. L. and Shmushkevich, I. M. The production of π-mesons by γ-rays on deuterium, 5100
Iperen, B. B. Van. *See* Van Iperen, B. B.
Irons, E. J. Graphical solutions to optical problems of three different types, 1482
Irvin, B. and Breazeale, F. B. The adaptation of the Norelco high-angle spectrometer to the measurement of the X-ray diffraction of fibers, 8718
Irving, J. The effect of the tensor force on the binding energy of the alpha-particle, 3519
Irwin, J. B. The determination of a light-time orbit, 2153
Isaac, N. *See also* Begemann, F., 1047
Isaac, N. and Picciotto, E. Ionium determination in deep-sea sediments, 5795
Isachsen, N. *See also* Holtebekk, T., 7907
Isachsen, N., Vangen, V. and Sörenson, S. O. Evidence for the direct production of κ-mesons, 5715
Isaenko, V. I. *See* Vol'kenshtein, A. A., 5937
Isakovich, M. A. Scatter [diffraction] of waves on a statistically rough surface, 5423. *See also* Ageeva, N. S., 1187
Isbell, D. E. *See* Kelly, J. M., 3291
Isbin, H. S. and Gorman, J. W. Applications of pile-kinetic equations, 2731

Ishak, I. G. H. Determination of the tristimulus values of the spectrum for eight Egyptian and one British observers, 1308

Ishiguro, K. The change of the refractive index of semi-conducting film irradiated by intense light, 8308

Ishiguro, K. and Katô, T. The reflection and transmission of a multi-layer film, 2381

Ishiguro, K. and Kuwabara, G. Phase and intensity measurements for some aluminium films, 4718

Ishiguro, M. On the X-ray diffraction halos of molten metals (Pb/Sn system), 1181. *See also* Satomura, S., 856

Ishiguro, M., Okuno, T. and Ueda, A. On the electrical properties of Si containing aluminium, 841

Ishiguru, M. and Mori, T. On the temperature effect of crystal rectifiers and the negative resistance, 850

Ishikawa, G. On the longitude effect of a corpuscular stream from the sun, 8813

Ishimatsu, T. *See* Nonaka, I., 256

Ishizaki, Y. *See* Hayashi, T., 1865

Ishkin, I. P. and Brodyanskiĭ, V. M. Thermodynamic analysis of irreversible low-temperature processes. I. Theoretical concepts and bases of a generalized method of analysis, 6023; II. Analysis of separate irreversible processes in low temperature technology, 6024

Iskraut, R. W. Angular momentum in Dirac's new electrodynamics, 1767

Isles, G. L. *See* Charnley, A., 6550

Ismailzade, I. G. The crystal structure of tetraphenylgermanium and the structure analysis of the tetraphenyl compounds of elements in the fourth group, 555

Ismailzade, I. G. and Zhdanov, G. S. The crystal structure of metallo-organic compounds. II. X-ray investigation of the crystal structure of tetraphenyl compounds of silicon, tin and lead, 7336; III. X-ray investigation of the crystal structure of tetra- para-tolyl tin, $Sn(C_6H_4CH_3)_4$, 8799

Isobe, M. On the magnetometric studies of transformation in pure manganese, 4056

Israel, H. I. Soft radiation from Pu^{239}, 1097

Isted, G. A. Multiple bursts of signal in long-distance very-high-frequency propagation, 5589

Itami, A. *See* Kawata, S., 6504

Itô, D. "Infra-red catastrophe"-like divergency in meson-decay process, 603. On the divergence of the transition probability due to energy conservation in intermediate states, 604

Itô, D., Tanaka, H., Watanabe, Y. and Yamazaki, M. Group theoretical aspects in *S*-matrix theory, 53

Itô, H. On the theory of continuous information, 1334. On the density matrix in Hartree–field, 6453

Itoh, J., Kusaka, R., Yamagata, Y., Kiriyama, R. and Ibamoto, H. Nuclear magnetic resonance experiment on a four-proton system in a single crystal of $K_2HgCl_4.H_2O$, 379*. Nuclear magnetic resonance experiment on the single crystals of $K_2HgCl_4.H_2O$ and $K_2SnCl_4.H_2O$. II. The resonance absorption due to four proton system and the revised determination of their crystal structures, 6140. Nuclear magnetic resonance experiments on $CuCl_2.2H_2O$, $K_2CuCl_4.2H_2O$ and $(NH_4)_2CuCl_4.2H_2O$, 7038

Itoh, J., Kusaka, R., Yamagata, Y., Kiriyama, R., Ibamoto, H., Kanda, T. and Masuda, Y. Nuclear magnetic resonance experiment on the single crystals of $K_2HgCl_4.H_2O$ and $K_2SnCl_4.H_2O$. I, 6139

Itoh, T., Ohno, K. and Kotani, M. On the valence theory of the methyl radical, 1815

Itterbeek, A. van. *See* van Itterbeek, A.

Iudalevich, F. F. Foundations of the theory of twilight phenomena with consideration of the influence of secondary scattering of light in the atmosphere, 5248

Ivanenko, D. and Brodskiĭ, A. Divisible processes and nonlinearity in the theory of elementary particles, 5300

Ivanenko, D. and Kolesnikov, N. On the theory of the isotopic shift, 7833

Ivanenko, D., Kurdgelaidze, D. and Larin, S. Remarks on non-linear mesodynamics, 6471

Ivanenko, D. and Larin, S. On the theory of the periodic system of elements, 7051

Ivanenko, D. and Lebedev, V. Multiple processes in interactions, 618

Ivanoff, M. The substitution reactions of brom activated by neutron capture. II. Study of formation of bromine derivatives of nitrobenz and of methyl and ethyl benzoates, 5173

Ivanov, I. D. *See* Brekhovskikh, L. M., 5375

Ives, H. E. Genesis of the query "Is there an ether 3847. Note on "Mass-energy relationship" J. Riseman and I. G. Young, 6445

Ives, R. L. Devices for calibration of slow-counting- meters, 1702

Ivey, H. F. Effect of filament voltage on the p current of a diode, 289. Color centers generate sodium chloride by electrolysis, 2061. Space cha limited currents between inclined plane electro Approximate solutions, 4172. Spectral location the absorption due to color centers in alkaline e halide crystals, 5399

Iwanaga, R. *See* Nishiyama, Z., 546

Iwasaki, H. Measurement of viscosities of gases at pressure. I. Viscosity of air at 50°, 100° and 15 up to 200 atmospheres, 3926

Iwata, G. Realization of special contact transfor tions with static electromagnetic fields *in vacuo*, 8

Iwata, T. *See* Hirone, T., 1763

Iwayanagi, H. Measurement of permittivity of mi barium and strontium titanate in 3000 Mc/s reg 8390

Iwayanagi, S. and Hideshima, T. Dynamical study the secondary anomalous absorption region polymethyl methacrylate, 6265. Low freque coupled oscillator and its application to high poly study, 6266

Iyengar, B. R. Y. *See* McGee, C. G., 2246

Jaccard, C., Känzig, W. and Peter, M. The perties of colloidal ferro-electrics. I. Potass phosphate KH_2PO_4, 8387

Jacchia, L. G. A comparative analysis of atmosph densities from meteor decelerations observed Massachusetts and New Mexico, 5232

Jacka, F. The southern auroral zone as defined by position of homogeneous arcs, 6335

Jackson, D. A. *See also* Brück, H. A., 2913

Jackson, D. A. and Kuhn, K. Silvered films dielectric multiple films in interferometry, 161

Jackson, E. W. and Garrard, L. Ion-exchanging faces in radiological decontamination, 4334

Jackson, H. L. and Galonsky, A. I. The excited st of the N^{13} nucleus, 2611

Jackson, H. L., Galonsky, A. I., Eppling, F. J., H R. W., Goldberg, E. and Cameron, J. R. $C^{12}(p, p)C^{12}$ differential cross section, 2688

Jackson, J. A. and Harrison, F. B. A slow compo in the decay of the scintillation phosphors, 2378

Jackson, J. D. and Schiff, H. Electron capture protons passing through hydrogen, 2515

Jackson, J. L. *See* Callen, H. B., 1399

Jackson, J. M. *See* Pietenpol, W. B., 4567

Jackson, L. C. *See also* Ham, A. C., 4765

Jackson, L. C. and Henshaw, D. G. Further obse tions on the helium II film by an optical met 4061

Jackson, R. *See* Egelstaff, P. A., 8708

Jacob, L. *See* Clarke, W. W. H., 4849

Jacobs, E. E. *See* Rabinowitch, E., 1513

Jacobs, G. The structure of silicon monoxide, 521

Jacobs, H. *See also* Dobischek, D., 7725

Jacobs, H., Freely, J. and Brand, F. A. The me nism of field dependent secondary emission, 90

Jacobs, J. A. Temperature of the interior of the e 1271. Temperature-pressure hypothesis and earth's interior, 3757. The earth's inner core, *See also* Schrader, C. D., 5030

Jacobs, M. and Ogle, K. N. Application of high s flash tube to photographing the fundus of the e color, 2872

Jacobs, P. On the pseudo-adiabatic transformatio open gaseous systems, 6693. Apparatus fo measurement of ionic conductance of solid 8015

Jacobs, P. W. M. and Tompkins, F. C. The the decomposition of potassium azide, 2001. photolysis of solid potassium azide, 2017 bsen, P. K. Measurement of the speed of projectiles, 6508

bsohn, B. A. A test for charge independence in high energy nucleon-nucleon scattering, 3369

bson, M. J. *See* White, R. S.; *see also under* Jakobson, M. J., 1148

uesson, J. *See* Bourgeois, J., 5723, 7962

uinot, P. *See also* Brochard, J., 1498, 5381, 5383

uinot, P. and Squire, C. Note on reflection and diffraction from ice crystals in the sky, 5811

er, J. C. The surface temperature of the moon, 3800. Conduction of heat in a solid with periodic boundary conditions, with an application to the surface temperature of the moon, 6695

e, A. A. and Cohen, S. G. The disintegration of radium D, 2655

é. G. Diffusion of neutrons, 1155

é, G. and LeMay, C. Z. On polarization in liquid dielectrics, 5453

e, H. *See* Cook, W. R., Jr, 1611, 4078

é, H. H. Free electron wave functions as approximations to MO wave functions for conjugated molecules, 360. Theoretical considerations concerning Hammett's equation. III. σ-Values for pyridine and other aza-substituted hydrocarbons, 363; IV. Calculation of ρ-values, 3507. The electronic structure of ferrocene, 1818. Some overlap integrals involving *d* orbitals, 2599. The use of free electron model wave functions in the derivation and representation of LCAO MO wave functions of conjugated molecules, 7011

fé, H. H. and Doak, G. O. On the stability of metallo-organic compounds, 2797

fe, J. H. The carbon arc as an infrared source, 6689

fey, A. H. *See* Freedman, M. S., 1881

fray, J. A new transition of ammonium dichromate crystals, 800. *See also* Bernard, M., 3297; Foex, M., 6951

fray, J. and Martin, P. On the transition points of anhydrous sodium carbonate, 6713

odzinski, H. *See* Halla, F., 8056

n, P. L. *See* Spence, R. D., 3435

n, S. C. *See also* Krishnan, K. S., 937

n, S. C. and Krishnan, K. S. Thermionic constants of metals and semi-conductors. II. Metals of the first transition group, 2516; III. Monovalent metals, 6905

nski, P. Methods of appraisal and measurement for retro-reflecting materials, 6584

eman, D. *See* Haddara, S. R., 6917

ob, M. An attempt to explain a discrepancy in observations of the heat transfer between a vertical surface and a fluidized bed of particles, 178

obson, M. J., Schulz, A. G. and White, R. S. The production of charged photomesons from helium. Hydrogen-helium ratios. II, 7955. *See also under* Jacobson, M. J.

es, C. G. and Sugden, T. M. Resonance radiation from hydrogen flames containing alkali metals, 4003

es, D. B. *See* Barnes, C. A., 7130

es, D. H. and Phillips, C. S. G. A simple gas-flow-control of high efficiency, 524

es, G. D. *See* Astbury, J. P., 5718

es, H. and Laffitte, P. On the spontaneous ignition and explosion limits of cyanogen-air mixtures, 5744. On the kinetics of long-delay flames in mixtures of cyanogen and air, 5745

mes, H. M. *See also* Krieger, T. J., 3723

mes, H. M. and Guth, E. Statistical thermodynamics of rubber elasticity, 6262

mes, J. A. *See* Milner, C. J., 3740

mes, N. R., Legvold, S. and Spedding, F. H. The resistivity of lanthanum, cerium, praseodymium, and neodymium, at low temperatures, 840

mes, R. A. *See* Tewes, H. A., 1108

mes, R. W. X-ray crystallography, 8065

mes, W. L. *See* Ingersoll, L. R., 1792, 2576

meson, D. *See also* Hurvich, L. M., 5818

meson, D. and Hurvich, L. M. Spectral sensitivity of the fovea. II. Dependence on chromatic adaptation, 8144

mgochian, E. *See* Lehovec, K., 1554

mieson, J. C. Phase equilibrium in the system calcite-aragonite, 8007

Jan, J.-P. Hall effect and temperature in ferromagnetic conductors, 5599. The phenomenological treatment of electrical and thermal conduction and its application to transverse galvanomagnetic and thermomagnetic phenomena, 7675

Jancel, R. *See also* Kahan, T., 6974

Jancel, R. and Kahan, T. Electromagnetic phenomena in the ionosphere: crossed effects of a constant magnetic field and oscillating electric field, 5594. Propagation of plane electromagnetic waves in the ionosphere, 7808

Jander, J. *See* Brauer, G., 6317

Janeschitz–Kriegl, H. Apparatus for rapid transformation of photometric curves into blackening curves, 102

Janin, J. *See* Crozet, A., 7589. Déjardin, G., 121

Jankus, V. Z. Radiative correction for the collision loss of heavy particles, 3870

Jánossy, L. The physical aspects of the wave-particle problem, 1371. The passage of a wave packet through a potential barrier, 1398. On the physical interpretation of the Lorentz transformation, 2173. The physical aspects of the wave-particle problem of quantum mechanics, 3855. Note on the fluctuation problem of cascades, 4197

Jansen, C. G. J. and Loosjes, R. The velocity distribution of electrons of thermionic emitters under pulsed operation. I. Apparatus and measuring technique, 4890. Graphs for a rapid calculation of the work function of thermionic emission, 7747

Janz, G. J. *See* Duncan, N. E., 500

Janzen, H. The absorption of high energy X-rays in various materials, 1089

Jaqué, L. *See* Beaujard, L., 2776

Jaquerod, A. *See* Payot, R., 5667

Jaques, T. A. J., Ballinger, H. A. and Wade, F. Neutron detectors for reactor instrumentation, 1159, 4398

Jardetzky, W. S. Remarque on critical reflections of elastic waves at free surfaces, 685. Comment on "A note on critical reflections of elastic waves at free surfaces," 3954

Jarmie, N., Repp, G. W. and White, R. S. Positive photomesons from hydrogen at 0°, 8701

Jarmotz, P. *See* Pepinsky, R., 7315

Järnefelt, G. On finite approximation of solutions of two ordinary differential equations belonging to the classical quantum mechanics, 4550

Jarrett, A. H. Silvered films and dielectric multiple films in interferometry, 161

Jarrett, H. S. Paramagnetic resonance absorption: hyperfine structure in dilute solutions of hydrazyl compounds, 4913

Jarvis, J. A. J. Crystal structure of potassium ethyl sulphate, 8112

Jarvis, R. G. and Roaf, D. The D–H^3 and D–He^3 reactions below 45 keV, 4352. Comparison of D–T and D–^3He at low energies, 7135

Jary, R. *See* Boullé, A., 8111

Jáson, A. C. *See* Ansbacher, F., 3285

Jastram, P. S., Whalen, J. A. and Zinke, O. H. Combination peaks: an energy addition effect in scintillation counters, 922

Jastram, P. S. and Whittle, C. E. Angular correlation of gamma-rays in Ti^{48}, 413

Jastrow, R. Note on the low-energy properties of the nucleon-nucleon interaction, 7459

Jauch, J. M. *See* Coester, F., 4617

Jauho, P. On the commutation relations and vacuum expectation values in the quantum theory of fields, 3857

Jauman, J. *See* Dürr, W., 4090

Jauneau, L. and Hug-Bousser, F. Measurements of grain density of tracks due to energetic particles recorded in photographic emulsions. Determination of minimum ionization, 1103

Javan, A. *See* Nethercot, A. H., Jr, 2336

Jawtusch, W. Scattering experiments with crossed molecular beams, 5110

Jaynes, E. T. The concept and measurement of impedance in periodically loaded wave guides, 333. Ferroelectricity, 4785

Jean, M. On a possibility for covariant generalization of the intermediate coupling theory. I, 1378; II, 1379. Contribution to the study of methods of second

quantization and of configuration space in the relativistic theory of systems of particles: Application to the derivation of relativistic equations for the deuteron. I. General formation of the passage from second quantization to configuration space; II. Deduction of relativistic equations, in configuration space, for a system of two fermions interacting through the medium of a neutral boson field of spin zero, 6459
Jean, M. and Prentki, J. Remarks on Feynman's method for charged mesons of spin one, 5299
Jech, C. Indirect autoradiography with a scintillation counter, 4547
Jefferies, J. T. Emission of radiation from model hydrogen chromospheres, 3817
Jeffery, J. W. Cameras for use with a fine focus X-ray tube, 2064
Jeffries, C. D. The spin and magnetic moment of Ca^{43}, 7039
Jeffries, Q. R. and Drickamer, H. G. Diffusion in the system CH_4-TCH_3 to 300 atmospheres pressure, 7504
Jeffries, T. O. *See* Davenport, P. A., 3588
Jelatis, J. G. *See* von Hippel, A., 8397
Jelley, J. V. Cerenkov detectors, 4882. *See also* Galbraith, W., 4513
Jelley, J. V. and Galbraith, W. Light pulses from the night sky, 8132
Jelley, J. V. and Whitehouse, W. J. The time distribution of delayed particles in extensive air showers using a liquid scintillation counter of large area, 6916
Jen, C. K., Bianco, D. R. and Massey, J. T. Some heavy water rotational absorption lines, 3133
Jenckel, E *See also* Klein, E., 3646
Jenckel, E. and DelaHaye, J. Phase separation of solutions of polymethylacrylic esters. II, 2037
Jenckel, E. and Gorke, K. Heat of solution of glasses, in particular of those of substances of high molecular weight [polymers], 3274
Jenckel, E., Hertog, H. and Klein, E. Evaluation of the relaxation periods from free torsional vibrations, 7209
Jenckel, E. and Klein, E. The determination of relaxation times from the elasticity of rebound, 2763
Jenkins, A. D. *See* Bamford, C. H., 4457
Jenkins, F. A. and Alvarez, L. W. Successive diffractions by a concave grating, 165
Jenkins, G. L., Cochran, L. W., Kern, B. D. and Hahn, T. M. The angular distribution of 12-MeV gamma rays from proton bombardment of B^{11}, 7899
Jenkins, I. *See* Dovey, D. M., 4400
Jenn Lin Hwang. Note on the frequency spectra of simple solids from specific heat data, 2582
Jennings, R. E. *See* Henderson, C., 3346
Jennison, R. C. *See* Brown, R. H., 1337
Jenny, L. *See* Hälg, W., 8161
Jensen, E. N., Laslett, L. J., Martin, D. S., Jr, Hughes, F. J. and Pratt, W. W. Radiations from selenium^{75}, 4999
Jensen, J. H. D. *See* De Witt, C. M., 6465
Jensen, L. H. Crystal structure of *iso*nicotinic acid hydrazide, 3748
Jensen, L. K. *See* Glass, N. W., 5672
Jensen, P. and Gis, K. The photodisintegration of the Li^6 nucleus into a deuteron and an α-particle, 5070
Jentschke, W. K. *See* Remley, M. E., 4150
Jeppesen, O. G. *See* Frank, V., 4235
Jerome, C. W. and Judd, D. B. Specification of color-rendering properties of fluorescent lamps, 6679
Jerrard, H. G. The examination and calibration of Soleil compensators, 3190
Jespersen, J. *See* Ingram, M., 2868
Jesse, W. P. and Sadauskis, J. Alpha-particle ionization in mixtures of the noble gases, 291. Alpha-particle ionization in pure gases and the average energy to make an ion pair, 6118
Jessop, H. T. On the Tardy and Sénarmont methods of measuring fractional relative retardations, 7617
Jessop, H. T. and Stableford, W. H. A method of correcting for initial stresses in frozen-stress observations, 8347
Jetter, E. *See* Fresco, J., 393
Jetter, E. S. and Blatz, H. Film measurement of beta radiation dose, 1079
Jetter, L. K. and Borie, B. S., Jr. A method
quantitative determination of preferred orien
5783
Jeudon, A. A high-speed electronic balance, 6503
Jewell, W. R. Apparatus for measuring internal fi
in transversely vibrating metal reeds, 2775
Jha, S. and Dube, G. P. On the α-instability o
earth nuclides, 5680
Jielof, R. *See* De Vries, H., 8141
Jnanananda, S. Long magnetic lens beta-ray sp
meters. I. Theory; II. Design and constru
3352
Joel, N., Vera, R. and Garaycochea, I. A metho
the estimation of transmission factors in cr
of uniform cross section, 8080
Joffe, B. *See* Ioffe, B.
Johannin, P. *See* Pérez, J. P., 835
Johannin-Gilles, A. Absorption of water vapo
the Schumann ultraviolet, 4717. Variation
temperature of the absorption of water vapo
the Schumann ultraviolet region, 6642
Johansson, S. A. E. *See* Almqvist, S., 1053
John, E. R. *See* Elson, R., 4367
John, H. *See* Eisenstein, A., 6910; Grattidge, W.
Johns, H. E. *See also* Haslam, R. N. H., 5042; Hor
R. J., 4524
Johns, H. E., Cormack, D. V., Denesuk, S. A.
Whitmore, G. F. Initial distribution of Com
electrons, 7112
Johns, H. E., Epp, E. R. and Fedoruk, S. O. A d
current amplifier recording system for pr
measurement of depth dose, 2870
Johns, M. W. *See also* McMullen, C. C., 7870
Johns, M. W., Cox, C. D., Donnelly, R. J. and
Mullen, C. C. Radioactive decay of indium
397
Johns, M. W., Waterman, H., MacAskill, D.
Cox, C. D. A description of a large double-focu
beta spectrometer and its application to a stud
the decay of In^{114}, 2491
Johnsen, S. E. J. and Schnelle, P. D. A precis
recording refractometer, 2315
Johnson, A. C. *See* Bleuler, E., 4996
Johnson, C. E. *See* Ambler, E., 5653
Johnson, C. P., Jr. A criticism of a recent unified f
theory, 2165
Johnson, C. T. and Hale, F. E. Abnormal sou
propagation over the southwestern United Sta
6336
Johnson, D. S. *See* Fowler, F. E., 2309
Johnson, E. G. and Nier, A. O. Angular aberrati
in sector shaped electromagnetic lenses for focus
beams of charged particles, 6837
Johnson, E. R. Production of iodine from solutions
potassium iodide irradiated with hard X-rays, 87
Johnson, E. R. and Allen, A. O. The molecular yi
in the decomposition of water by hard X-rays, 3
Johnson, F. A. and Foster, J. S. Auger transitions
silver, 5045
Johnson, F. S. High-altitude diurnal temperat
changes due to ozone absorption, 8127
Johnson, J. B. and McKay, K. G. Secondary elect
emission of crystalline MgO, 7724
Johnson, J. L. and McHale, J. L. The calculation
the half-widths of one-body resonances, 7132
Johnson, N. R. *See* Sheline, R. K., 3554, 5676
Johnson, P. D. Absolute optical absorption from diff
reflectance, 1536
Johnson, P. D. and Williams, F. E. Electron traps
the thallium-activated potassium chloride phosph
2368
Johnson, R. D. and Martin, A. B. The effect
cyclotron bombardment on self-diffusion in sil
1171
Johnson, R. E. A modified isotopic exchange
expression, 8729
Johnson, R. H. and Jones, D. E. H. Decay of light
very low levels from spark discharges, 867
Johnson, V. A. *See also* Finlayson, D. M., 227
Johnson, V. A. and Shipley, F. M. The adiabatic
effect in semiconductors, 4808
Johnson, V. A. and Whitesell, W. J. Theory of
magnetoresistive effect in semiconductors, 3303
Johnson, W. H., Jr. Mass of K^{40}, 1856

nston, H. L. *See* Adams, G. B., Jr, 3272; Keller, W. E., 1009; Skinner, G. B., 7623; Smith, A. L., 1517, 6006; White, D., 805, 2413, 6983
nstone, C. W. A new pulse-analyzer design, 4165
iet, J.-F. Surface tensions and covalent radii, 6521. On the temperature of fusion of polythenes, 7260
ly, W. L. Heats, free energies, and entropies in liquid ammonia, 824
y, M. The use of streaming birefringence data to determine the size and size distribution of rod-shaped interacting particles, 4748
a, F. *See* Humbel, F., 4789
es, C. K. A highly stable automatic X-ray diffraction apparatus with only one moving part, 7307
es, C. W. On reducible non-linear differential equations occurring in mechanics, 4552. A short table for the Bessel functions $I_{n+\frac{1}{2}}(x)$, $(2/\pi)K_{n+\frac{1}{2}}(x)$, 5828
es, D. Removal of an inconsistency in the theory of diffraction, 1464
nes, D. A., Jones, R. V. and Stevenson, R. W. H. Infra-red transmission limits of single crystals of some fluorides, 3148
nes, D. E. H. *See* Johnson, R. H., 867
nes, D. S. Diffraction by an edge and by a corner, 4226. Diffraction by a thick semi-infinite plate, 4924. The eigenvalues of $\nabla^2 u + \lambda u = 0$ when the boundary conditions are given on semi-infinite domains, 8256
nes, E., Edelman, S. and London, A. Long-tube method for field determination of sound-absorption coefficients, 2303
nes, E. A. *See* Fuson, N., 138; Lagemann, R. T., 756; Stephenson, C. V., 1551
nes, E. R. S. A simple quartz infra-red spectrometer for the determination of absorbed water in some polymers, 4694
nes, F. Llewellyn [Conf. rep.]. Electrical discharges in gases, 246
nes, F. Llewellyn. Electrical discharges, 8427. *See also* Dutton, J., 6063, 6812
nes, F. Llewellyn and de la Perrelle, E. T. Field emission of electrons in discharges, 3345
nes, F. Llewellyn and Morgan, C. G. Surface films and field emission of electrons, 6079
nes, F. Llewellyn and Williams, G. C. Collisional processes and similarity in high frequency discharges in helium, 1655. The electrical breakdown of gases in non-uniform fields at low pressure, 6066
ones, G. A. *See also* Wilkinson, D. H., 8638
ones, G. A. and Wilkinson, D. H. The reaction $Li^7(\alpha, \gamma)B^{11}$ and states of B^{11}, 429. A determination of the Doppler effect for gamma-rays of 4·5 and 4·8 MeV, 1088. The radiative capture of protons in fluorine, 3577. The purity of isotopic spin or charge parity states, 6183
ones, G. M. D. B. *See* Fowler, G. N., 6896
ones, G. O. *See also* Chester, P. F., 4766; Davies, R. O., 4401, 8710; Pryde, J. A., 1954
ones, G. O. and Stacey, F. D. The saturation magnetization of nickel at high pressure, 4237
ones, H. The valency of the transition metals in some binary and ternary alloys, 8035
Jones, H. L. and Hess, P. N. Identification of tornadoes by observation of waveform atmospherics, 1303
Jones, J. L. *See* Kemp, J. W., 791
Jones, J. W. and Kohman, T. P. Synchrocyclotron production and properties of magnesium 28, 4997
Jones, K. W. *See also* Craig, D. S., 1111; Donahue, D. J., 2693
Jones, K. W., Donahue, D. J., McEllistrem, M. T., Douglas, R. A. and Richards, H. T. The breakup energy of Be^8, 7862
Jones, L. H., and Penneman, R. A. Infrared spectra and structure of uranyl and transuranium (v) and (vi) ions in aqueous perchloric acid solution, 3149
Jones, L. W. and Terwilliger, K. M. Photoneutron production excitation functions to 320 MeV, 7931
Jones, M. H. and Steacie, E. W. R. The photochemical decomposition of azomethane, 6297
Jones, R. C. The general theory of bolometer performance, 1478. On reversibility and irreversibility in optics, 2306
Jones, R. E. Instrumentation for measuring changes in phase of ionospheric echoes, 7347
Jones, R. F. [Conf. rep.]. Application of radar to meteorology, 2094
Jones, R. V. An optical slit mechanism, 114. Pressure of radiation, 6579. *See also* Jones, D. A., 3148; Paul, W., 479, 3130
Jones, T. B., Skolnik, M. and Kouwenhoven, W. B. The electric arc in argon and helium, 5489
Jones, W. H. *See* Fowler, J. L., 435
Jones, W. M. Luminescence behaviour in tritium oxide, 1542. *See also* Hunt, S. E., 4349
Jong, D. de. *See* de Jong, D.
Jong, G. de Josselin de. *See* de Josselin de Jong, G.
Jongejans, B. *See* Clay, J., 4184
Jongen, H. F. *See* Clay, J., 2853, 4184
Jongenburger, P. The extra-resistivity owing to vacancies in copper, 6036
Jonker, C. C. *See* Blok, J., 2742–3
Jonker, G. H. and van Santen, J. H. Magnetic compounds with Perovskite structure. III. Ferromagnetic compounds of cobalt, 6938
Joos, G. The wave field in front of a concave mirror, 4669. A variable infrared filter, 4720
Jorand, M. Radioelectric radiation from sunspots at 160 Mc/s, 1948–51, 7399
Jordan, H. L. Non-localized interactions in the quantum theory of elementary particles and fields, 7446
Jordan, P. On the integration of the cosmological equations, 19. On the axiomatic foundation for quantum mechanics, 1370. On the conservative laws of physics. II. 2934. The invalidity of Birkhoff's theorem in the extended theory of gravitation, 4583
Jordan, W. C., Cork, J. M. and Burson, S. B. The decay of Rh^{104m} (4·3 min) and Rh^{104} (44 sec), 6199
Josien, M.-L. *See also* Fuson, N., 138
Josien, M.-L. and Fuson, N. Spectroscopic study of the hydrogen bond in light and heavy trifluoroacetic and trichloroacetic acids, 1509. The valence frequency of NH in pyrrhole and benzopyrrholes, 8748
Josien, M.-L., Fuson, N., Lebas, J.-M. and Gregory, T. M. An infrared spectroscopic study of the carbonyl stretching frequency in a group of *ortho* and *para* quinones, 2595
Josien, M.-L., Fuson, N. and Pearson, D. E. The C = O valence vibration and the Hammett constant in a series of benzophenones, 1808
Josselin de Jong, G. de. *See* de Josselin de Jong, G.
Jost, R. and Kohn, W. Equivalent potentials, 55
Jost, W. Observations on the Bunsen burner, 803
Jouvin, J. On the estimate of the form parameter of the energy spectrum of electrons from μ-meson decay, 7953
Jouy, M. *See* Guénoche, H., 7628
Judd, D. B. *See* Jerome, C. W., 6679
Juenker, D. W., Colladay, G. S. and Coomes, E. A. Surface barrier analysis for the highly refractory metals by means of Schottky deviations, 6120
Jugaku, J. On the radiation field of the extended stellar atmospheres, 3826
Julien, C. A. *See* Cullity, B. D., 5780
Jung, J. J. *See* Cüer, P., 4354, 5062, 7921
Junge, C. Remarks on formation of ice nuclei in the frost-supersaturated region, 7356
Junger, M. C. The physical interpretation of the expression for an outgoing wave in cylindrical coordinates, 2279. Vibrations of elastic shells in a fluid medium and the associated radiation of sound, 3034
Jupnill, H. *See* Bennett, A. H., 789
Jura, G. *See* Alder, B. J., 183
Jürgens, G. The temperature and electron density in a water-stabilized arc, 5488
Jurić, M. Direct measurement of particle track length in photonuclear emulsion, 4548
Justi, E. A thermostat for the attainment of 50° abs. without the use of liquid hydrogen, 3263
Justi, E. and Lautz, G. On the semiconducting properties of intermetallic compounds (CdSb), 1638. On impurity and intrinsic semiconduction of intermetallic compounds. II, 3306
Justi, E. and Schultz, H. On the question of superconductivity of disturbance-centre semiconductors (PbS), 4814
Jutsum, P. J. *See* Ditchburn, R. W., 6644

Kabiel, A. M. *See* Ibrahim, A. A. K., 60, 8253
Kac, M. and Ward, J. C. A combinatorial solution of the two-dimensional Ising model, 2811

Kachickas, G. A. and Fisher, L. H. Formative time lags of uniform field breakdown in N_2, 869. Formative time lags of uniform field breakdown in argon, 7694

Kadosch, M. Inert flow expressed in Lagrange variables, 2231. *See also* Le Foll, J., 2230

Kaempffer, F. A. Note on the concept of vacuum in quantum electrodynamics, 2188. The physical meaning of auxiliary conditions in the theory of gravitational waves, 4584. Theory of the electromagnetic vacuum (Preliminary report), 4595; I, 4596

Kahan, T. On variational methods in collision and diffraction theory, 5288. *See also* Jancel, R., 5594, 7808

Kahan, T. and Jancel, R. General expression for the conductivity tensor and the dielectric tensor in an ionized layer. Various applications: Hall effect and generalization of the Langevin formula of mobility, 6974

Kahl, G. D. *See* Bennett, F. D., 2383

Kahn, A. H. and Kittel, C. *F*-center wave functions and electronic *g*-values in KCl crystals, 2546

Kahn, D. The energy loss of protons in metallic foils and mica, 4873

Kahn, M. and Wahl, A. C. Some observations on the chemical behavior of iodine at low concentrations, 7232

Kaipov, D. *See* Takibaev, Zh., 5558

Kaiser, E. R. Acoustical vibrations of rings, 5905

Kaiser, T. R. *See also* Closs, R. L., 3802

Kaiser, T. R. and Greenhow, J. S. On the decay of radio echoes from meteor trails, 4560

Kaĭtmazov, S. D. *See* Kocharyan, N. M., 5550

Kakudo, M. and Watase, T. Crystal structure of diethysilanediol and its hydroxyl groups, 2834

Kales, M. L. Modes in wave guides containing ferrites, 6970

Kalil, F. and Birkhoff, R. D. Straggling distributions for electrons in passing through thin foils, 7723

Kalinin, Yu. D. *See* Afanaseva, V. I., 2838

Kalitsin, N. S. Electromagnetism and gravitation, 6446. A generalization of the equations of electrodynamics, 6447. On a new nuclear theory, 7027

Kalkwarf, D. R. *See* Frost, A. A., 2406

Kallman, H., Kramer, B. and Perlmutter, A. Induced conductivity in luminescent powders. II. A.C. impedance measurements, 2380

Kallmann, H. *See also* Furst, M., 2379, 8340

Kallmann, H., Furst, M. and Sidran, M. Scintillation counting techniques, 920

Kallmann, H. K. The continuous layer formation in the atmosphere under the influence of solar radiation, 5234

Kalm, M. *See* Gibson, G. E., 6296

Kalnajs, J. *See* Smakula, A., 8048

Kalshoven, J. *See* Van der Held, E. F. M., 6696

Kam Li. *See* Carstensen, E. L., 3040

Kamata, K. *See* Nishimura, J., 263

Kambe, D. *See* Deutscher, K., 8436

Kambe, K. Hysteresis loops of ceramic barium titanate at higher frequencies. II, 1614. *See also* Abragam, A., 7841

Kambe K., Nakada, I. and Takahasi, H. Hysteresis loops of ceramic barium titanate at higher frequencies. I, 1613

Kameda, T. and Wada, M. Seasonal variation of large cosmic-ray bursts, 4188

Kamefuchi, S. Radiative corrections to β-decay matrix element, 4316

Kamefuchi, S., Nakai, H. and Kawabe, R. *S*-matrix and nucleon isobar, 51

Kamiyoshi, K. Low frequency dispersion in Ni- and Co-ferrites, 4081. Dielectric properties of vapors adsorbed on silica gel. I, 4453

Kamiyoshi, K.-I. and Odake, T. Dielectric dispersion of water vapor adsorbed on silica gel, 7652

Kampen, N. G. van. *See* van Kampen, N. G.

Kan, B. *See* Davison, S., 8649

Kanazawa, H. A note on the interaction between electrons and lattice vibrations in metals, 4243. On the spin-orbit interaction and the saturation requirements, 4605

Kanda, E. and Sugawara, T. On the atomic distrib tion curves for liquids. I. A comment on Sharr and Gingrich's work on liquid oxygen, 3920

Kanda, T. *See* Itoh, J. 6139; Masuda, Y., 8565

Kandiah, K. A simple pulse-amplitude analyser f low counting rates, 6112. A scaling unit employi multi-electrode cold-cathode tubes, 6895

Kane, J. A. *See* Mott, W. E., 6095

Kane, R. P. *See* Sarabhai, V., 4190, 4192, 7764

Kane, T. *See* Mindlin, R. D., 3954

Kane, W. R. *See also* Broida, H. P., 3143

Kane, W. R. and Broida, H. P. Rotational "ter peratures" of OH in diluted flames, 2410

Kangro, C. *See* Suhrmann, R., 6042

Kannangara, M. L. T. *See also* Goldsack, S. J., 77

Kannangara, M. L. T. and Shrikantia, G. S. Cosm rays at 60 m.w.e. underground. III. The anom lous scattering of μ-mesons, 8499

Kannangara, M. L. T. and Zivkovic, M. Cosmic ra at 60 m.w.e. underground. I. The knock-on ele trons and nuclear interactions produced by rel tivistic μ-mesons, 7753

Kantrowitz, A. *See* Resler, E. L., 681

Kantz, A. and Hofstadter, R. Electron-induce showers in copper, 2495

Kanzaki, H. Pure gliding of metal crystals, 7212

Känzig, W. *See* Jaccard, C., 8387

Kapadnis, D. G. and Gogate, D. V. Heat losses an their dependence on air velocity, 3234

Kaplan, H. *See* Keffer, F., 4201

Kaplan, J. and Kittel, C. Exchange frequency electro spin resonance in ferrites, 4905

Kaplon, M. F. and Ritson, D. M. Emulsion clou chamber observations on the interactions of hig energy primary cosmic radiation, 311

Kaplon, M. F., Ritson, D. M. and Walker, W. I High energy nuclear interactions in lead and lig elements, 6127

Kappler, E. and Reimer, L. X-ray investigation residual strains in plastically deformed iron, 8723

Kapustin, A. P. and Fomina, M. A. Dissolution steel in sulphuric acid under the influence of ultr sound, 5766

Kapustyan, E. K. *See* Annaev, R. G., 7689

Kar, K. C. and Kundu, S. K. On a new theory of alph disintegration, 7083

Kar, S. C. Investigation of a logical quantum dynami of electrons. I, 3862

Karal, F. C. The motion of a sphere moving parall to a plane boundary, 2996. The analogous acou tical impedance for discontinuities and constrictio of circular cross section, 3051

Karamyan, A. S. and Ter-Martirosyan, K. A. On th question of the measurement of the spins of nucle 3518

Karasev, V. V., Krotova, N. A. and Deryagin, B. Investigation of electron emission on stripping hig polymer films from glass in a vacuum, 7709

Karbowiak, A. E. *See* Barlow, H. M., 2566, 6581

Karel, M. *See* Davison, S., 8649

Karle, J. *See also* Hauptman, H., 2818, 8089

Karle, J. and Hauptman, H. The probability distrib tion of the magnitude of a structure factor. I. Th centrosymmetric crystal, 2817. Application of stati tical methods to the naphthalene structure, 8090

Karlik, B. *See* Hiessberger, F., 5006

Karlsson, N. *See* Hägg, G., 7303

Karnaukhova, N. M. *See* Dobretsov, L. N., 7696

Karp, S. N. *See* Bazer, J., 4933

Karpenko, A. S., Markevich, A. M. and Ryabinin Yu. N. Electrical conductivity of gases at hig temperatures and densities, 5471

Karplus, R. Quantum electrodynamics, 3864

Karplus, R., Kivelson, M. and Martin, P. C. A no on meson-nucleon scattering, 5860

Karpman, V. I. On the question of the connectio between the method of regularization and the theo of particles with arbitrary spin, 7444

Karraker, D. G., Hayden, R. J. and Inghram, M. Half-lives of Eu^{152}, Eu^{154} and Sm^{151}, 395

Karrȳev, N. A. *See* Gross, E. F., 5389, 5390

Kartuzhanskiĭ, A. L. Connection between the sens tivity of a photographic emulsion to a short-duratio illumination and its electron sensitivity, 2123

runes, B. On the distribution of stress in a deep beam containing two equal circular holes, 2969
rush, W. and Young, G. Temperature rise in a heat-producing solid behind a surface defect, 798
rzmark, C. J. *See* Thompson, R. W., 5720, 7172
sh, S. W. and Woods, D. C. Measurement of the transport mean free path of thermal neutrons in O$_2$O by a boron poisoning method, 5115
sowski, S. *See* Stevens, K. N., 5934
ssel, L. S. The mechanism of unimolecular reactions, 6281
ssenbeck, P. and Trillat, J. J. On the electron microscope examination of sections of textile fibres by a double replica method, 5128
stha, G. S. On the absorption of u.h.f. radio waves in solutions of cresols in benzene, 3468
stler, A. *See* Brossel, J., 5662
stler, D. Quantum theory of the hydrogen fluoride molecule, 6994. On the contribution of non-bonding electrons to covalent energy, exemplified by the hydrogen fluoride molecule, 6995
stner, J. The half-life of europium-152, 154, 2649. *See also* Ghosh, A., 8667
stner, J. and Whyte, G. N. The half-life of Co^{60}, 7066
stner, S. *See* Altenburg, K., 1447
tayama, T. On the temperature dependence of the magnetostriction constants in iron, 4236
tayama, Y. and Yamazaki, K. Convergence problem in quantum electrodynamics, 3863
tcoff, S. *See* Caretto, A. A., Jr, 4370
to, K. Reflection of sound wave due to a hollow cylinder in an elastic body, 688. The upper limit of measuring frequency of the sound pressure measuring equipment by Rayleigh disc in pipe, 698
to, N. Dynamical theory of electron diffraction for finite polyhedral crystal. III. Fresnel diffraction formula, 6326
tô, T. *See* Ishiguro, K., 2381
ts, M. L. Influence of excitation levels on the luminescence in the ultra violet of alkali halide crystals coloured by X-rays, 3170. Fluorescence of ions and atomic centres of copper in NaCl-Cu phosphors, 7588. Luminescence of atomic and ionic silver centres in NaCl–Ag phosphors, 8328
tsman, Yu. A. Equations for the oscillations in a homogeneous flow of electrons, 6966
tsuki, K. *See* Hayashi, M., 1512
tterbach, K. The wave functions of Al III and Al IV, 8644
tti, P. K. The swelling and aggregation of colloid particles during the sol-gel transition, 2027
atz, H. Metal capillary cathodes, 6909
atz, L. *See also* Baker, R. G., 4310; Goldemberg, J., 4358, 4360; Haslam, R. N. H., 2706; Montalbetti, R., 7143, 7930; Summers–Gill, R. G., 2708
atz, L., Baker, R. G., and Montalbetti, R. The photoneutron cross sections of Rb^{87}, Zr^{90}, and Mo^{92}, 7138
atz, L., Pease, L. and Moody, H. The photoneutron cross sections for the reactions Br$^{81}(\gamma, n)$ Br^{80} and Br$^{81}(\gamma, n)$Br^{80*} and an analysis of the ratio between these cross sections, 7137
atz, M. L. *See* Kats, M. L.
atzenstein, H. S. *See* Friedland, S., 3374
atzin, L. I. Note on the absorption spectrum of iodine in oxygenated solvents and the dissociation of iodine water, 3134
auffman, J. W. and Koehler, J. S. The quenching-in of lattice vacancies in pure gold, 536
aufman, F. and Kelso, J. R. Kinetics of decomposition of nitric oxide, 5156
aufman, S. *See* Wieder, H. H., 3287
aufmann, A. R. *See* Lin, S. T., 8582
aufmann, S. G., Goldberg, E., Koester, L. J. and Mooring, F. P. Energy levels in Si^{28} excited by alpha-particles on Mg^{24}, 1105
avanagh, R. W. *See also* Penner, S. S., 4706
avanagh, R. W., Björnerud, E. K. and Penner, S. S. Nomogram for the evaluation of blackbody radiancy and of peak and total intensities for spectral lines with Doppler contour, 4680
avanagh, R. W. and Penner, S. S. Nomogram for the evaluation of blackbody radiancy and of peak and total intensities for spectral lines with Lorentz contour, 4681
Kawabe, R. *See* Kamefuchi, S., 51
Kawaguchi, I. On the population of the hydrogen atoms in the second state in the solar chromosphere, 3811
Kawaguchi, M. and Mugibayashi, N. Some consequences of gauge invariance, 8232
Kawaguti, M. Discontinuous flow past a circular cylinder, 6515
Kawai, N. *See* Nonaka, I., 256
Kawamura, H. A note on the theory of the electron multiplication in insulating crystals, 8439
Kawata, S. and Itami, A. Remote measurement of density of a liquid of variable surface level, 6504
Kay, H. F. Report on researches with ferroelectric materials, 3286
Kay, H. F. and Appelbe, B. The surface of beryl and cadmium iodide crystals, 4467
Kay, R. L. *See* Gordon, A. R., 2801
Kaya, S. Uniaxial anisotropy of a permalloy crystal, 8530
Kayas, G. Contribution to the study of methods of separation and identification of nuclear isomers, 3573
Kayas, G. and Morellet, D. Photometric measurements of the ionization of tracks in photographic plates, 8304
Kayser, H. W. The grid X-ray stereoscope, 2877
Kazantseva, M. V. The absolute calibration of sound receivers by the reciprocity method in a tube with standing waves, 3958
Kazarnovskiĭ, I. A. *See* Neĭding, A. B., 522
Kazieva, B. K. *See* Takibaev, Zh. S., 1719
Keane, A. Variation of the incompressibility of an elastic material subjected to large hydrostatic pressure, 8720
Keating, D. T. and Warren, B. E. The effect of a low absorption coefficient on X-ray spectrometer measurements, 540
Keck, J. and Littauer, R. Production of photomesons in deuterium, 448
Keck, P. H. and Broder, J. The solubility of silicon and germanium in gallium and indium, 4646
Keck, P. H., and Golay, M. J. E. Crystallization of silicon from a floating liquid zone, 5195
Keefe, D., Nevin, T. E., McCusker, C. B. A. and Porter, N. A. Gaseous contamination of Geiger–Müller counters, 275
Keegan, T. J. Long X-ray pulses from the betatron, 6829
Keenan, P. C. Differences in abundances between the atmospheres of stars of type C, M, and S, 6437
Keepin, G. R. *See* Stratton, W. R., 438
Keesom, P. H. *See also* Pearlman, N., 817
Keesom, P. H., Lark-Horovitz, K. and Pearlman, N. The effect of neutron bombardment on the low temperature atomic heat of silicon, 1801
Keesom, P. H. and Pearlman, N. An anomaly in the low temperature atomic heat of silver, 816
Keesom, W. H., Bijl, A. and Monté, L. A. J. *W* log *p* diagrams of methane and ethylene, 4065
Keffer, F. Spin-spin relaxation in ferromagnetic resonance, 953
Keffer, F., Kaplan, H. and Yafet, Y. Spin waves in ferromagnetic and antiferromagnetic materials, 4201
Kehrer, V. J. and Leidheiser, H., Jr. The phase transformation of cobalt as observed on single crystals, 4764
Keilson, J. and Storer, J. E. On Brownian motion, Boltzmann's equation and the Fokker–Planck equation, 2963
Keim, C. P. Calutron charge materials for stable-isotope separation, 390
Keith, H. D. and Mitchell, J. W. Experience on the reduction of crystals of silver bromide, 8162
Kelbg, G. *See* Falkenhagen, H., 2244, 2785, 5752, 8737
Keller, A. Morphology of crystalline synthetic polymers, 3703
Keller, G. and Fenwick, M. Tabulation of the incomplete Fermi–Dirac functions, 8643
Keller, H. B. Plane waves in the ionosphere, 3463
Keller, J. B. Diffraction of a shock or an electromagnetic pulse by a right-angled wedge, 690. Bohm's interpretation of the quantum theory in terms of "hidden" variables, 2939. Finite amplitude sound waves, 3038. Parallel reflection of light by plane mirrors, 7542

Keller, J. M. *See* Bureau, A. J., 1428
Keller, J. W. *See* Hall, W. C., 4159
Keller, K. *See* Seiler, K., 6041
Keller, W. E. and Johnson, H. L. A note on the vibrational frequencies and the entropy of decaborane, 1009
Kelliher, M. G. *See* Goulding, F. S., 7192
Kellogg, D. A. Cross sections for products of 90-MeV neutrons on carbon, 4368
Kellogg, W. N., Kohler, R. and Morris, H. N. Porpoise sounds as sonar signals, 4675
Kelly, A. Neumann bands in pure iron, 5736. *See also* Gay, P., 2758–9
Kelly, F. M. and MacDonald, D. K. C. On θ values in metals, 1594
Kelly, J. M. and Stenoien, J. O. Effect of particle size on magnetic loss tangent of obstacle type artificial dielectrics, 7803
Kelly, J. M., Stenoien, J. O. and Isbell, D. E. Waveguide measurements in the microwave region on metal powders suspended in paraffin wax, 3291
Kelso, J. R. *See* Kaufman, F., 5156
Kemball, C. Catalysis on evaporated metal films. II. The efficiency of different metals for the reaction between methane and deuterium, 5159
Kemény, Á. *See* Bardócz, A., 638
Kemp, E. L. Gated counter requires no feedback, 4168
Kemp, J. W., Jones, J. L. and Durkee, R. W. A source unit for Raman spectroscopy, 791
Kemp, L. A. W. The röntgen deficiencies in present-day free-air chamber standards, 8441
Kemp, P. H. Thermodynamics of irreversible electrochemical processes, 2012
Kempni, K. Fresnel's two mirror experiment, 4740
Kendall, J. T. Electronic conduction in silicon carbide, 5469
Kendrick, W. M. *See* Turner, T. W., 4016
Kennedy, A. J. A single crystal extensometer, 7217. On the generality of the cubic creep function, 7218. Creep of copper under stress pulses, 7219. Creep and recovery in metals, 7221
Kennedy, A. J. [Conf. rep.]. Plasticity of materials, 1192
Kennedy, S. W., Ubbelohde, A. R. and Woodward, I. The persistence of crystal axes in a thermal transformation, 8107
Kennedy, W. B. *See* Richardson, J. M., 1286
Kenney, J. *See* Froman, D., 7763
Kenty, C. and Larson, D. A. Enhancement of the green continuum of Hg by a rare gas, 1665
Kenyon, J. Electron microscope photographs of polished mineral surfaces, 7984
Kerker, M. On the use of unfiltered light in determining molecular weights by light scattering, 520
Kerker, M. and Hampton, M. I. The use of unfiltered light in determining particle radius by the polarization ratio of the scattered light, 4745
Kerker, M., Langleben, P. and Gunn, K. L. S. Scattering of microwaves by a melting spherical ice particle, 5809
Kerker, M. and Perlee, H. E. Additional light scattering functions for spherical particles of refractive index 2, 1561
Kern, B. D. *See* Jenkins, G. L., 7899
Kern, E. and Pick, H. Surface structures on evaporation of single crystals of alkali halides, 7285
Kern, H. E. *See* Lander, J. J., 1174
Kern, R. Crystal faces as a function of the supersaturation of the mother liquors, 5772
Kern, R. and Tillmann, M. Influence of the degree of supersaturation of mother liquors and of impurities on crystal faces, 5773
Kerner, E. H. The expansion of a fissionable gas as a source of atomic power, 7157
Kerr, E. C. *See* Adams, G. B., Jr, 3272
Kerst, D. W. *See* Edwards, P. D., 7109
Kerwin, L. Note on the resolving power of mass spectrometers, 6861
Kessler, D. and Maze, R. On the penetrating secondary component of μ-mesons, 2528
Kessler, H. K. and Sutherland, G. B. B. M. The out-of-plane deformation frequency of the NH group in the peptide link, 4954
Kessler, P. Double excitation of the two-electron atom, 5663
Kestigian, M., Colodny, P. and Stein, R. S. A lig scattering investigation of the polymolybdates, 598
Ketelaar, J. A. A. *See* Couture-Mathieu, L., 11 4710
Ketelle, B. H., Brosi A. R. and Porter, F. M. G lium 67, 5003
Keuper, J. P. *See* Hereford, F. L., 6229
Keyser, W. L. De. *See* De Keyser, W. L.
Khaĭkin, M. S. Surface resistance of superconducti tin at 9400 Mc/s, 5477
Khalatnikov, I. M. Heat exchange between a so body and helium II, 806. Kinetic coefficients helium II, 3257. Thermal conductivity and abso tion of sound in helium II, 3258. Hydrodynamics solutions of extraneous particles in helium II, 544 Sound in solutions of extraneous particles helium II and the dissipative function of solution 5444. Shock waves and sound of large amplitude helium II, 5445
Khaleq, A. and Vassy, A. Diurnal variation of reduc thickness, and average temperature of atmosphe ozone at low latitudes, 1280
Khalil, M. Abd El-Wahab. *See* Abd El-Wah Khalil, M.
Khan, M. A., Norrish, R. G. W. and Porter, G. T photolysis of acetaldehyde, diacetyl and acetone high intensity, 8022
Khan, N. A. Studies by infrared spectra on the init tion process in autoxidation of methyl linolena 5965
Kharanen, V. Ya. On the spreading of sound in mec with random fluctuations in refractive index, 6553
Kharasch, M. S., Zimmt, W. and Nudenberg, Photobromination of pentane, 513
Kharitonov, V. Measurement of ionizability of pa ticles on the new magnetic spectrometer, 6898. *S also* Alikhanyan, A., 5552
Kharkevich, A. A. Analysis of impulses by means resonators, 1771
Khastgir, S. R. and Setty, P. S. V. Radio-frequen oscillations in a.c. silent discharges, 254. Positi and negative Joshi effect in a.c. "silent" discharg in iodine vapour, 1656. The formation of electric double-layer on and near the glass surface in a "silent" discharges, 4125. Effect of light on t frequency of the r.f. oscillations in a.c. sile discharges, 4822
Khastgir, S. R. and Srivastava, C. M. Effect of he on the frequency of the r.f. oscillations in a "silent" discharges, 4124. Streamer mechanisms a.c. "silent" discharges, 6817
Khodakov, A. L. *See* Belyaev, I. N., 4788, 577 Novosil'tsev, N. S., 5454*, 5457
Khokhlov, Yu. K. Nuclear photo-effect at high energies, 5702
Khol'nov, Yu. V. *See* Dzhelepov, B. S., 5689
Khotkevich, V. E. On the question of structure metals, plastic deformation at low temperatures, 627
Khotsyanova, T. L., Kitaĭgorodskiĭ, A. I. a Struchkov, Yu. T. The crystal structure tetraiodoethylene, C_2I_4, 8096
Khotsyanova, T. L. and Struchkov, Yu. T. An X-r study of the crystal structure of *o*-iodobenzoic ac 6321. An X-ray study of crystals of diphenyliod nium iodide, 6322. An X-ray study of the cryst structure of diphenyliodonium chloride, 6323
Khrimyan, A. Generation of protons by the neut component of cosmic radiation, 7778
Khristov, Kh. Ya. Propagation of electromagne waves through a crystal plate, 6576. Propagation X-rays through a crystal plate, 6577. The propag tion of light waves through a crystal plate, 6578
Kiehn, R. M., Goodman, C. and Hansen, K. F. Tot neutron cross sections of chlorine and carbon, 715
Kiepenheuer, K. O. Is the general magnetic field of t sun measurable? 6420. Photoelectric measureme of solar magnetic fields, 8187
Kiess, C. C. Wavelengths of rotational lines in t water-vapor bands at 0·93 and 1·13 microns, 234
Kihlborg, L. *See* Blomberg, B., 8104
Kikuchi, C., Sirvetz, M. H. and Cohen, V. W. Nucle spin of V^{50} by paramagnetic resonance, 380
Kikuchi, M. and Onishi, T. A thermoelectric study the electrical forming of germanium rectifiers, 331

kuchi, R. *See* Kurata, M., 2965

kuchi, Y. On the theory of electro-striction vibration—substitution of magnetostriction theory, 1626

lmister, C. W. A new quaternion approach to meson theory, 3873. A note on Milner's $\mathscr{E}$-numbers, 7372. *See also* Stephenson, G., 8209

lpatrick, J. E. A quantum-mechanical treatment of virial coefficients, 2260. Negative cluster concentrations, 7513. *See also* Putnam, W. E., 5903, 6551

lpatrick, M. L. *See* Hillenbrand, L. J., Jr, 3678

m, Y. B. *See* Salvini, G., 301

mball, C. *See also* Hamermesh, B., 6230

mball, C. and Hamermesh, B. Activation cross sections measured with antimony-beryllium photoneutrons. II, 5079

mura, S. On mechanisms of mercury vapour arc discharge. I. Reactive character of mercury arc, 4117; II. Structure of mercury arc, 4118; III. Some characters of mercury arc, 4119

mura, T. and Miyachi, Y. On the rôle of longitudinal and scalar photons, 34

nchin, G. H. The electrical properties of graphite, 4087

nd, A. On nuclear dynamics, 8634

nder, E. On the proportioning of small [electron] microscopes, 6840

ng, F. T. *See* Hirt, R. C., 746

ng, G. W. *See also* Emslie, A. G., 8310

ng, G. W. and Emslie, A. G. Spectroscopy from the point of view of the communication theory. III. The amount of information in a spectrum, 8311

ng, J. C. and Fairbank, H. A. Second sound velocity in He^3–He^4 mixtures below 1°K, 6729

ng, J. I. Transfer theory for purely pressure-broadened band spectra, 4511

ng, J. S. and Parkinson, W. C. A further test of the shell model, 376. Angular distribution of protons from vanadium 52, 3595

ng, J. W. *See* Birks, J. B., 3174

ng, K. M. *See* Davis, K. E., 310

ng, R. Theory of electrically short transmitting and receiving antennas, 334. An alternative method of solving Hallén's integral equation and its application to antennas near resonance, 3454

ng, R. F. *See* Wilkie, M. J., 8258

ng, R. W. and Peaslee, D. C. Odd-odd spins and *j-j* coupling, 6175

ng, W. C. and Gordy, W. One to two millimeter wave spectroscopy. I, 4713

ngton, J. D. *See also* Bair, J. K., 5060; Willard, H. B., 6226

ngton, J. D., Bair, J. K., Carlson, R. R. and Willard, H. B. The mass difference Si^{27}-Al^{27}, 3537

noshita, T. *See* Aizu, K., 462

nosita, K. Numerical evaluation of the intensity curve of a multiple-beam Fizeau fringe, 4040

nsey, B. B. *See also* Bartholomew, G. A., 1893, 2671

nsey, B. B. and Bartholomew, G. A. Neutron capture γ-rays from titanium, chromium, iron, nickel, and zinc, 2670. The measurement of energies and intensities of γ-rays with a pair spectrometer, 5039. The strength of electric dipole radiation, 5690. Note on some neutron capture γ-rays from magnesium, 7892

inumaki, S. and Sasaki, K. On the electric conductivity of B_2O_3–Na_2O and B_2O_3–K_2O systems in fused glassy state, 4085

nzinger, E. Further measurements of the single scattering of electrons by nuclei, 8447

ip, A. F. Microwave resonance absorption in gadolinium metal, 8555. *See also* Griswold, T. W., 1602; Portis, A. M., 6775

ip, A. F., Kittel, C., Portis, A. M., Barton, R. and Spedding, F. H. Microwave resonance absorption in gadolinium metal, 2537*

ipling, J. J. *See also* Blackburn, A., 3237

ipling, J. J. and Tester, D. A. Adsorption from binary mixtures: determination of individual adsorption isotherms, 3695

ippenhahn, R. Orion variables and turbulence in the Orion nebula, 8194

irakosyan, Z. A. *See* Kocharyan, N. M., 5550

irby, P. L. Electrical conductivity measurements using direct currents, 7664. Internal friction in glass. I. Theoretical aspects, 8003. A method of examining the transverse vibrations of rods and reeds, 8281

Kirchgessner, W. G. *See* Smith, W. S., 6257

Kiriyama, R. *See* Itoh, J., 379*, 6139, 6140, 7038

Kirk, P. L. *See* Craig, R., 2321

Kirk, R. D. *See* Schulman, J. H., 1538

Kirkaldy, J. S. *See* Westcott, C. H., 6893

Kirkbride, J. A fast and efficient neutron detector, 4397

Kirkwood, J. G. *See* Salsburg, Z. W., 67, 5904; Zwanzig, R. W., 6741

Kirota, K. Quantum-mechanical treatment of viscosity coefficient of helium by use of a rigid sphere model with attractive force, 4058

Kirschner, F. *See* Korn, T., 720

Kirvalidze, I. D. *See* Gogoberidze, D. B., 1993

Kisliuk, P. and Geschwind, S. The microwave spectrum of arsenic trifluoride, 5396

Kissinger, C. W. *See* Perlow, G. J., 303

Kita, I. and Minakawa, O. On the nuclear interactions of cosmic ray shower particles in lead, 4198

Kitagaki, T. A focusing method for large accelerators, 4145

Kitai, R. Impulse electromagnetic fields, 978

Kitaĭgorodskiĭ, A. I. *See* Khotsyanova, T. L., 8096; Kozhin, V. M., 8798

Kitchen, F. A., Pressey, B. G. and Tremellen, K. W. A review of present knowledge of the ionospheric propagation of very-low, low- and medium-frequency waves, 2575

Kittel, C. *See also* Abrahams, E., 1739; Griswold, T. W., 1602; Kahn, A. H., 2546; Kaplan, J., 4905; Kip, A. F., 2537*; Portis, A. M., 6775

Kittel, C. and Abrahams, E. Dipolar broadening of magnetic resonance lines in magnetically diluted crystals, 4217. Relaxation processes in ferromagnetism, 8537

Kitz, N. and Marchington, B. A method of Fourier synthesis using a standard Hollerith senior rolling total tabulator, 8088

Kiuti, M. Aberration of decentred optical systems, 3969

Kivelson, D. A $(K + 2)nd$ order formula for asymmetry doublets in rotational spectra, 3500

Kivelson, D. and Wilson, E. B., Jr. Approximate treatment of the effect of centrifugal distortion on the rotational energy levels of asymmetric-rotor molecules, 353. Theory of centrifugal distortion constants of polyatomic rotor molecules, 6996. An aid in the determination of internal parameters from rotational constants for polyatomic molecules, 6997

Kivelson, M. *See* Karplus, R., 5860

Kjeldaas, T., Jr. *See* Fox, R. E., 2510

Klages, G. The Kerr effect in Onsager liquids, 1627

Klasens, H. A. On the nature of fluorescent centers and traps in zinc sulfide, 3157. *See also* Bril, A., 1549, 1555

Kleber, W. *See* Eversheim, P., 3745

Klechkovskiĭ, V. M. Concerning the sequence in the filling in of electronic levels of atoms, 3526. $(n + l)$ groups of terms in the spectra of alkali elements, 3527

Klee, C. W. and Stauss, H. E. Sparking potentials between separating contacts, 5486

Klein, A. Symmetric pseudoscalar theory of nuclear forces, 3875. The Tamm–Dancoff formalism and the symmetric pseudoscalar theory of nuclear forces, 5855. Convergence of the adiabatic nuclear potential, 7458

Klein, D. *See* Oxley, C. L., 7730

Klein, D. J. *See* Muller, D. E., 1084

Klein, E. *See also* Jenckel, E., 2763, 7209

Klein, E. and Jenckel, E. On the temperature dependence of the modulus of elasticity in high polymers, 3646

Klein, G. and Prigogine, I. The statistical mechanics of irreversible processes. I, 6492; II, 6493

Klein, M. W. *See* Smakula, A., 2048

Klein, N. Rheological properties of a high asphaltene content bitumen, 494

Klein, O. On the emission of sound waves from an electron in a metal and the theory of superconductivity, 235

Klein, R. Investigation of the surface reaction of oxygen with carbon on tungsten with the field emission microscope, 7256

Kleiner, W. H. Crystalline field in chrome alum, 969. Orbital effect in neutron-electron magnetic scattering, 5302

Kleinknecht, H. Silicon single crystal rods, 1245
Kleinn, W. *See* Menzel, E., 4683
Klema, E. D. and McGowan, F. K. Gamma-gamma angular correlation in Ni^{60}, 7895
Kleman, B. The 2700 Å-system in the band-spectra of AlH and AlD, 4704
Klemens, P. G. The failure of Matthiessen's rule for heavily deformed alloys, 4423. *See also* Krishnan, K. S., 2211
Klemm, A., Lindholm, E. and Lundén, A. Isotopic effect of the electrolytic migration of zinc ions in fused zinc bromide, 1216
Klemperer, O. Electron optics, 6836. *See also* Graham, R. L., 2490
Klenin, S. I. *See* Tsvetkov, V. N., 6531
Klepikov, N. P. *See* Sokolov, A. A., 8224
Klepp, H. Some aspects of isotope enrichment by means of high speed centrifuges, 7852. *See also* Holt, N., 7161, 7163
Klerk, D. de. *See* de Klerk, D.
Klick, C. C. Luminescence and photoconductivity in cadmium sulfide at the absorption edge, 1547. *See also* Schulman, J. H., 5944
Klick, C. C. and Schulman, J. H. On the luminescence of divalent manganese in solids, 770
Klimontovich, Yu. L. and Silin, V. P. On the theory of excitation spectra of macroscopic systems, 5307. On the spectra of systems of interacting particles, 5309
Klinkenberg, P. F. A. Tables of nuclear shell structure, 1831
Klipphahn, O. A nomogram for functions of more than three variables, 3788
Kloepper, R. M. Angular correlation of the Ni^{60} γ-γ cascade, 8666
Kloepper, R. M., Lennox, E. S. and Wiedenbeck, M. L. Angular and direction-polarization correlation for Co^{60}, Cs^{134}, and Sb^{124}, 1074
Kluge, M. *See* Schubert, K., 8097
Kluge, W. and Weber, S. Pulsed irradiation of differently arranged photocathodes with semiconducting intermediate layers, 7678
Klumb, H., Robens, E. and Scholz, O. Supersonic velocities in high vacua, 5900
Kluyver, J. C. and Milatz, J. M. W. An infrared isotope analyzer, 7060
Klyarfel'd, B. N. The formation of strata in electrical discharge in gas, 3325
Kneser, H. O. and Voelz, K. Explanation of the internal damping of solids by shear-viscosity and pressure-viscosity, 5146
Knight, B. W., Jr. Canonical field theory—a prototype example, 7520
Knight, H. T. *See* Duff, R. E., 504
Knight, J. D., Bunker, M. E., Warren, B. and Starner, J. W. The radiations of U^{240} and Np^{240}, 7874
Knipe, R. H., Sponer, H. and Cooper, C. D. Temperature dependence of the naphthalene bands at 3200–2900 Å, 4012
Knipper, A. *See* Gorodetzky, S., 7879
Knol, K. S. and Volger, J. Is a superconductor free from noise? 6803
Knoop, E. The gas triode as pulse amplifier tube, 7733
Knuckles, C. F. and Swensson, J. W. The spectrum of lightning in the region λ 6 159–λ 7 157, 5255
Knudsen, H. L. Some vector formulae and examples of their application, 5579
Kobayashi, A. On the transmissibility of light through a cloud [of] particles. (For the wave-lengths from 4320 Å to 9500 Å), 5803
Kobayashi, T. *See* Masumoto, H., 4054
Kobayashi, Y. A study of the radioactive decay of RaD by a spherical condenser-type spectrometer, 7872. *See also* Hirota, K., 2252
Kobayashi, Y. and Miyamoto, G. Auger and conversion lines from RaD, 7900
Kobe, K. A. and Lynn, R. E., Jr. The critical properties of elements and compounds, 6714
Kober, H. The optical constants of gold and silver in the ultraviolet, 2318. The absorption in an electron gas mixture, 2429
Kobrynski, M. Approximate calculation of the efficiency of acoustic treatment of aircraft carriers, 3071
Koch, B. Reflection of microwaves by detonation phenomena, 5153
Koch, K. M. *See* Nedoluha, A., 213; Neumann, 6807
Koch, R. *See* Lehovec, K., 8768
Kocharyan, N. M., Saakyan, G. S., Aĭvazyan, M. Kirakosyan, Z. A. and Kaitmazov, S. D. A stu of the composition of cosmic rays at a height 1000 m above sea level, 5550
Kochendörfer, A. The fundamental laws of flow amorphous and crystalline materials, 6269. *See a* Fischer, P., 3715; Seeger, A., 6268
Kock, W. E. The problem of selective voice cont 1472. An acoustic gyrator, 5925
Kock, W. E. and Miller, R. L. Dynamic spect grams of speech, 1471
Koehler, J. S. *See* Kauffman, J. W., 536; Weertm J., 7216
Koehler, W. C. and Wollan, E. O. Slow neut scattering cross-sections for rare earth nuclides, 79 Paramagnetic scattering of neutrons by trivalent i of [Pr], Nd and Er, 8527
Koeller, R. C. *See also* Cuddeback, R. B., 3923
Koeller, R. C. and Drickamer, H. G. The effect pressure on self-diffusion in carbon disulfide, 22 The effect of pressure on diffusion in CS_2 orga mixtures, 3922
Koenig, J. F. On the zeros of polynomials and degree of stability of linear systems, 3781
Koenig, S. *See* Franken, P., 388
Koenig, S. H., Prodell, A. G. and Kusch, P. anomalous magnetic moment of the electron, 38
Koenigsberg, E. Conductivity of thin films in a lo tudinal magnetic field, 6808
Koester, L., Maier-Leibnitz, H., Mayer-Kuckuk, Schmeiser, K. and Schulze-Pillot, G. The integration energy of Ti^{51}, 1872
Koester, L., Maier-Leibnitz, H. and Schmeiser, On the absorption of electrons and positrons, 60
Koester, L. J. *See* Kaufmann, S. G., 1105
Kofoed-Hansen, O. Nuclear recoil and detection of neutrino, 5111
Kofoed-Hansen, O. and Winther, A. Cross term β-decay, 3558. β-decay of mirror nuclei and shell model, 5687
Kogan, V. S. and Pines, B. Ya. A fine focus X tube with regulated focal spot size, 2066. equilibrium diagram of the system In-Pb, 2754
Kohler, D. A. *See* Ch'en, S.-Y., 5956
Kohler, M. The formulation of the laws of conse tion of energy and momentum in the general the of relativity. II, 5845. On the derivation of the equations in the general relativistic theory of gr tation, 5846
Kohler, R. *See* Kellogg, W. N., 4675
Köhler, U. "Weather perception"—a solar effect, 8
Kohman, T. P. *See* Jones, J. W., 4997
Kohn, A. A radioactive technique for the estimatio tantalum in ferroniobiums and niobium mine 7267. *See also* Faraggi, H., 2129
Kohn, W. *See* Jost, R., 55
Koicki, S., Ballini, R. and Chaminade, R. Spec metry using scintillations (with coincidence meas ment for β and γ rays) and consecutive γ rays f radioactivity of Sc^{46}, 7069
Koide, S. *See also* Taketani, M., 48
Koide, S. and Usui, T. The effect of He^3 ingredien the thermal Rayleigh disc torque, 192
Kojima, S. and Ogawa, S. Proton magnetic resona absorption in cetyl alcohol, 6138
Kojima, S., Takayama, K. and Shimauchi, A. Pr measurement for high frequency discharge. III, 1
Kojima, S., Tsukada, K., Ogawa, S. and Shimauch Nuclear quadrupole resonance of bromine in m cular solids, 8621
Kojima, Y. *See* Okamura, T., 1747, 4207, 4212, 4 6940
Kokes, R. J., Long, F. A. and Hoard, J. L. Diffu of acetone into polyvinyl acetate above and be the second-order transition, 656
Kokhanenko, P. N. and Gol'tsev, V. D. Splittin absorption bands of excess metal in sublimed films, 8319
Kolb, A. C. and Streed, E. R. The intensity of spec lines produced in nonhomogeneous flames, 1489
Kolb, E. D. *See* Slichter, W. P., 7279
Kolb, O. *See* Feldtkeller, R., 6144

AUTHOR INDEX

olb, W. Measurement of thicknesses from 10 to 100 mm with gamma rays and Geiger counter, 5312. *See also* Gerthsen, C., 8480
olesnikov, N. *See* Ivanenko, D., 7833
olin, A. A method for adjustment of the zero setting of an electromagnetic flow meter without interruption of flow, 2995. An electromagnetokinetic phenomenon involving migration of neutral particles, 3321
ollath, R. *See also* Fleischmann, R., 6742
ollath, R. and Menzel, D. The measurement of the charge of moving electrons, 6743
oller, L. R. Ultraviolet radiation, 2394. Monolayer fluorescent screens, 7584
olodin, M. V. *See* Annaev, R. G., 5604
olodner, I. I. *See* Morawetz, C. S., 6545
olodziejczyk, L. The influence of magnetic impulses on the kinetic energy of electrons, 6835
olomenskiĭ, A. *See* Bolotovskiĭ, B., 7713
olomiets, B. T. Internal photoelectric effect in polycrystalline cadmium sulphide, 5473
olontsova, E. V. *See* Kvitka, S. S., 2072
olossvary, B. G. Three lecture room demonstrations in the field of electricity, 3444
olsky, H. Stress waves in solids, 4421
omori, H. The transition effect of star production, 4195
omori, H., Miyanaga, K. and Ogawa, S. The burst production by the μ-meson, 469
ompaneets, A. On the new formulation of electrodynamics by Dirac, 5450. Application of the self-adjusting field method to the nucleus, 7830
ompaneets, A. S. *See* Voevodskiĭ, V. V., 3682
ondo, S. and Oda, T. Phase transitions of the barium dicalcium *n*-butyrate, 182
ondo, S.-I. and Matsumoto, M. Colour-centers of KCL-KBr mixed crystals in visible region, 8775
ondorskiĭ, E. On the theory of single domain particles, 5564
önig, L. A. and Schubert, G. U. Some special switching-on and release processes in superconductors, 6060
onopinski, E. J. *See* Mahmoud, H. M., 1888
onstantinova, V. P. and Shubnikov, A. B. Vibrations of "textural" piezoelectric Rochelle salt laminae, 1469
onstantinova-Shlezinger, M. A., Gorbacheva, H. A. and Panasyuk, E. I. Characteristics of phosphors with sulphate bases, 5402
ontorovich, M. I. and Murav'ev, Yu. K. Deduction of the laws of reflection of geometrical optics on the basis of the asymptotical treatment of problems in diffraction, 5939
ónya, A. *See* Gáspár, R., 7818
oomen, M., Scolnik, R. and Tousey, R. Measurement of accommodation in dim light and in darkness by means of the Purkinje images, 2109
oomen, M. J. *See* Tousey, R., 2915
oonce, S. E. and Arnold, S. M. Growth of metal whiskers, 4468
opfermann, H. *See* Brix, P., 1499
opineck, H.-J. Two-centre interaction integrals. III, 3485
ordes, E. Ion radii and ion polarizability in rock salt lattices with ions with identical complete shells, 2059
orn, G. A. and Korn, T. M. Electronic analog computers, 577
orn, T. and Kirschner, F. The analysis of transitory acoustic phenomena on reduced scale models, 720
orn, T. M. *See* Korn, G. A., 577
ornblith, L., Jr. *See* Anderson, H. L., 1685
orndorffer, A., Rahbek, H. and Sultan, F. S. A. The effect of mechanical deformation on the growth of cadmium iodide crystals from solution, 2044
ornetzki, M. A relation between the Jordan hysteresis constant and the initial permeability [of ferromagnetic media], 6145
ornetzki, M., Brackmann, J., Frey, J. and Gieseke, W. Measurements on ferrite cores of high permeability. II, 6130
orolev, A. M. Radiative capture of a fast neutron in hydrogens, 3602
orolev, F. A. Hyperfine structure of the green line of mercury, 6607. On the theory of a multiple etalon (multiplex), 7607
Korringa, J. and Gerritsen, A. N. The cooperative electron phenomenon in dilute alloys, 8609
Korshunov, A. V. Low frequency spectra of combination scattering of the crystals of parachlorphenol parabromphenol and of their mixed crystals, 5408, *See also* Gross, E. F., 3166
Korshunov, A. V. and Sel'kin, V. A. Spectra of the combination scattering of mixed crystals of some organic substances, 5407
Kortüm, G., Baur, H. and Friedheim, G. On the problem of fluorescence quenching by foreign substances, 768
Kortüm, G. and Haug, P. Reflection spectra of powders, 8324
Kortüm, G. and Maier, H. On the question of the relation between photo-current and illumination intensity in photocells and photomultipliers, 7540
Kortüm, G. and Wilski, H. Electrical conductivity of iodine-pyridine solutions, 8736
Koski, W. S. *See also* Maybury, P. C., 4444
Koski, W. S., Lucy, F. A., Shreffler, R. G. and Willig, F. J. Fast jets from collapsing cylinders, 643
Kosman, M. S. Some remarks on the paper "Dynamics of barium titanate polarization process," 3289
Kossel, W. An analogue for the demonstration of selective absorption of coupled wave-trains, 3736. On plastic flow, 6270
Kostarev, A. I. Theory of the X-ray absorption and emission spectra in ionic crystals, 1672. Observations on articles by A. I. Kostarev, 6072
Kosten, L. On the accuracy of measurements of probabilities of delay and of unexpected times of delay in telecommunication systems. II. Estimates of average times of delay, 3793
Koster, G. F. Localized functions in molecules and crystals, 2589
Kostkowski, H. J. *See* Humphreys, C. J., 2330
Kostryukova, M. O. and Strelkov, P. G. Specific heat of solid oxygen below 4° K, 8384
Kotani, M. *See* Itoh, T., 1815; Miller, S. L., 4947; Nakamura, T., 8618
Kotani, T., Takebe, H., Umezawa, M. and Yamaguchi, Y. Notes on the decay of the neutron. I–II, 2741
Kothari, D. S. *See* Auluck, F. C., 7169
Kothari, L. S. On a modified definition of Riesz potential for the meson case, 1388. Application of Dirac's δ-function to some problems in classical physics, 2212. Multiple meson production, 3617. The production of heavy mesons, 6239. Motion of a particle across a potential jump, 7469
Kotosonov, N. V. On the theory of permittivity measurement in the centimetre range, 6028
Kotov, A. G. *See* Arkad'ev, V. K., 5567
Kottmann, A. *See* Seith, W., 3631
Kourganoff, V. and Busbridge, I. W. Basic methods in transfer problems, 2923
Kouvelites, J. S. On the motion of electrons in non-sinusoidal periodic fields, 4474. *See also* Hoare, F. E., 956
Kouwenhoven, W. B. *See* Jones, T. B., 5489
Kovačič, E. A simple micromanometer, 8252
Kovacs, A. and Laurent, P. Influence of fatigue phenomena on the elastic modulus of steels, 1188
Kovács, I. The evaluation of the rotational constants for diatomic molecular levels from perturbation data. III, 2332
Kovács, I. and Budó, Á. Studies of the blue bands of SrO, 2335. Studies of the blue bands of the SrO molecule, 7561
Koyasu, M. *See* Igarashi, J., 2284
Kozakevitch, P., Chatel, S. and Sage, M. The surface tension of liquid iron-carbon alloys, 8260
Kozhin, V. M. and Kitaĭgorodskiĭ, A. I. Low-temperature investigations of the structures of aromatic compounds. I. Anisotropy of the thermal expansion of naphthalene, 8798
Kozyrev, B. M., Salikhov, S. G. and Shamonin, Yu. Ya. Paramagnetic resonance absorption and dispersion of the susceptibility of some crystalline salt powders at a frequency of $9 \cdot 62 \times 10^9$ c/s, 3431
Kraitchman, J. Determination of molecular structure from microwave spectroscopic data, 1822
Kramer, B. *See* Furst, M., 2379; Kallman, H., 2380

Kramer, J. Surface of investigation of metals and non-metals with exo- and photoelectrons, 4833

Kramers, H. A. On a modification of Jaffé's theory of column-ionization, 3396. Some reflections on phonons and rotons, 4062

Kramers, H. C., van den Burg, F. A. W. and Gorter, C. J. Heat pulses in helium II between 0·1°K and 1·0°K, 6730

Kramish, A. Spontaneous fission *versus* alpha-decay, 1864*

Krasil'nikov, V. A. and Tatarskiĭ, V. I. On the dependence of the mean square fluctuation of phase and amplitude on the dimensions of the objective for the observation of shimmering stars, 6384

Krasnov, V. M. and Stepanov, A. V. Investigation of the starting points of fracture by optical methods. I. 5739

Kratky, O., Schauenstein, E. and Sekora, A. Relations between small-angle interferences of silk and the wax content, 1180

Kratz, P. M. *See* Greenfield, M. A., 1683; Norman, A., 4449

Kraus, A. A., Jr, French, A. P., Fowler, W. A. and Lauritsen, C. C. Angular distribution of gamma-rays and short-range alpha-particles from N^{15} $(p, \alpha\gamma)C^{12}$, 1907

Krause, B. and Renninger, M. Electric charging phenomena during crystallization and solution, 5895

Kraushaar, J. J. *See also* Church, E. L., 416

Kraushaar, J. J. and Goldhaber, M. Direction and polarization correlations of successive gamma-rays, 3563

Kraushaar, J. J., Wilson, E. D. and Bainbridge, K. T. Comparison of the values of the disintegration constant of Be^7 in Be, BeO, and BeF_2, 5002

Krautz, E. New high light-intensity apparatus for photochemical reactions, 2020

Kravtchenko, J. *See* Fortier, A., 5320

Krebs, A. *See* Parr, W., 4534

Krebs, H. The influence of dipole moment on the type and properties of inorganic crystal lattices, 8770

Krebs, H., Thees, R. and Meyer-Eppler, W. A new photomechanical method of calculating atom-distributions in amorphous substances, 8074

Krebs, K. and Nelkewski, H. On the isotope shift in the resonance line of ytterbium, 7560

Kreiken, E. A. The period-density law $P\sqrt{\bar{\rho}} = \text{constant}$ for spectroscopic binaries, 1348. The density of stars of different spectral types, 6434

Kretschmar, G. G. and Wedaa, H. W. An optical method for the study of impinging jets in a liquid stream, 5884

Kreyszig, E. *See* Gebauer, R., 6853

Kriegel, W. W. *See* Sutton, P. P., 8154

Krieger, J. M. and Elrod, H. Direct determination of the flow curves of non-Newtonian fluids. II. Shearing rate in the concentric cylinder viscometer, 2990

Krieger, T. J. and James, H. M. A theory of successive rotational transitions in crystals, 3723

Kriessman, C. J. The high temperature magnetic susceptibility of V, Nb, Ta, W, and Mo, 8558

Krigbaum, W. R. *See* Flory, P. J., 2986

Kripyakevich, P. I. The dependence of the quantitative composition of a phase on the ratio of the atomic radii in one class of intermetallic phases, 5213. *See also* Gladyshevskiĭ, E. I., 5217

Krishna Rao, K. V. *See* Bhagavantam, S., 8346

Krishnaji and Swarup, P. Collision broadening of the microwave spectrum of ammonia, 6632

Krishnamurty, V. G. Π–$^5\Sigma$ electronic transition in cobalt chloride, 3108. The complex band spectrum of nickel chloride (NiCl), 3109

Krishnan, K. S. *See also* Jain, S. C., 2516, 6905

Krishnan, K. S. and Jain, S. C. Thermionic constants of the iron group of metals, 937

Krishnan, K. S. and Klemens, P. G. The temperature variation of the thermodynamic potential of a degenerate electron gas, 2211

Krishnan, K. S. and Roy, S. K. The dispersion formulae and polarization fields, 1604. The polarization fields and the resonance frequencies of the alkali halide crystals, 4082

Kristensen, P. and Møller, C. On a convergent meson theory. I, 2196

Kristiansson, K. Photo-electric determination of t mass of the Bristol κ_1-meson, 4386

Kroemer, H. *See* Burgess, R. E., 4832

Krogh-Moe, J. A remark on some new methods phase determinations, 8783

Kroll N. M. and Foldy, L. L. The effect of char symmetry on nuclear reactions, 612

Kröll, V. St. *See* St. Kröll, V.

Kroll, W. On the determination of the elastic spect of solids from specific heat data, 8772

Krömer, H. On the theory of the germanium rectifi and transistor, 6051. *See also* Paetzold, K. H 5952

Kromhout, R. *See* Rabinowitch, E., 1513

Kron, G. A set of principles to interconnect the sol tions of physical systems, 7374

Kronberger, H. *See* Davies, M. G., 4768

Krone, R. W. *See* Reardon, W. A., 7106

Kröner, K. and Pungs, L. On the behaviour of th dielectric loss factor of natural wood in the hig frequency range, 1624

Kronheimer, E. H. Calculation of nuclear bindi energies with single-particle oscillator wave function 6176

Kronig, R. On the hydrodynamics of non-viscous flui and the theory of helium II. III, 8375

Kronig, R. and Thellung, A. On the hydrodynami of non-viscous fluids and the theory of helium 3255

Kropveld, R. E. W. *See* Sterk, M. J., 7866; Wapstr A. H., 3551

Krotkov, R. V. *See also* Scheidegger, A. E., 2964

Krotkov, R. V. and Scheidegger, A. E. Therm dynamics of some special fields, 2185

Krotova, N. A. *See* Karasev, V. V., 7709

Krozer, S. P. *See* Tsvetkov, V. N., 7499

Krucoff, D. *See* Harrer, J. M., 460

Krüger, H. and Meyer-Berkhout, U. Determinati of the magnetic moment of the As^{75} nucleus from th Zeeman effect of a nuclear quadrupole transitio 6180

Kruger, P. and Sugarman, N. Evidence for a 25·5-da Sr–76-sec Rb chain, 4993

Kruger, P. G. *See* Remley, M. E., 4150

Krumbein, A. D. *See* Grant, F. A., 4291

Krumbiegel, J. Photoelectric measurements on Zn single crystals, 860. *See also* Herforth, L., 8758

Krumhansl, J. A. and Schwartz, N. The calculati of *F*-center energy levels, 4477

Kruse, H. W., Mellor, G. P. and Fowler, C. M Beta-ray spectrometer line shapes with tilted source 7721

Kruse, U. E., Ramsey, N. F. and Malenka, B. J. Th electric scattering of deuterons, 2703

Krusen, F. H. *See* Herrick, J. F., 5814

Krystyan, K. J. *See* Bartholomew, E. L., Jr, 3666

Krzywoblocki, M. Z. On the equations of isotrop turbulence in magneto-hydrodynamics of a com pressible medium, 2232. On the fundamentals locally isotropic turbulence in magneto-hydr dynamics of a compressible medium, 2992

Krzyżański, M. On the elementary solution of the he equation, 2895

Kubanskiĭ, P. N. The use of the shadow method i acoustics, 5907. The behaviour of resonant system in the field of sound waves of large amplitude, 590

Kübler, A. and Nenning, P. A new Geiger-Müll apparatus for radiation measurements, 3376

Kubo, R. The spin-wave theory as a variational metho and its application to antiferromagnetism, 8518

Kubota, H. On the increase of contrast by means of th sensitive color, 3225

Kuchitsu, K. *See* Morino, Y., 1003

Kuckes, A. F. and Ingård, U. A note on acoust boundary dissipation due to viscosity, 6569

Kudryavtseva, A. *See* Baskova, K., 3543*

Kuffler, S. W. *See* Talbot, S. A., 2115

Kuhlmann-Wilsdorf, D. *See* Wilsdorf, H., 6252–

Kuhn, H. The Doppler effect and spectroscopic r solving powers, 1494. Chemical binding and ele tronic states in molecules, 8036. *See also* Baertsch P., 7854; Weidmann, J. J., 7828

Kuhn, K. *See* Jackson, D. A., 161

Kuhn, W. *See* Baertschi, P., 7854; Silberberg, A 653; Weidmann, J. J., 7828 ins, P. W. *See* Weltmann, R. N., 2791

per, G. P. Comets and the dissipation of the solar nebula, 6400. Review of present observational data on stellar abundances, 6437

cke, W. *See* Richter, H., 1179

eshov, P. I. On the effect of crystalline structure on the yield point of a polycrystal, 6275

ikov, A. M. *See* Vernov, S. N., 7773

karni, S. B. Molecular weight determination by thermistors, 3698

lback, S. A note on information theory, 2143

lp, J. L., Tryon, L. E., Eckelman, W. R. and Snell, W. A. Lamont natural radiocarbon measurements. II, 1046

lp, J. L. and Volchok, H. L. Constancy of cosmic ray flux over the past 30 000 years, 6125

lscar, F. *See* Berlincourt, D. A., 832

mabe, I. *See* Hayashi, T., 1865

mada, M. *See* Murata, H., 5974

mai, M. Electron-microscope study of snow crystal nuclei, 5245

mar Saha, A. *See* Chatterjee, S., 7894

mmel, H. Free electrons in unitary quantum electrodynamics, 4593

mmel, U. *See* Böer, K. W., 766, 876

ndu, D. N. *See also* Hammond, W. R., 4992

ndu, D. N., Donaven, T. W., Pool, M. L. and Long, J. K. Nuclear reactions with 21-MeV He^3 in a cyclotron, 4343

ndu, D. N. and Pool, M. L. Inverse Oppenheimer–Phillips process in the Cu^{65} (He^3, α) reaction, 7911

ndu, S. K. *See* Kar, K. C., 7083

nin, P. E. and Taksar, I. M. The penetration through a potential barrier of a particle with spin ½ in the case of scalar interaction, 5850. The number of stable states of a particle with spin ½ in a central field with a pole of high order, 5852. Magnetic field of a finite solenoid, 6129

nitomi, N. Internal friction of ferromagnetic substance due to rotation of spontaneous magnetization, 1755. Internal friction of ferromagnetic superlattice alloy Ni$_3$Fe, 1756. Internal friction of field-cooled ferromagnetic substances. II. 65-Permalloy and Perminvar, 1765

nstadter, J. W., Floyd, J. J. and Borst, L. B. Long-lived delayed neutrons from fission, 7937

nz, W. E., Moak, C. D. and Good, W. M. Energy levels in Be^8 from the reaction Li^6(He^3, p)Be^8, 7912

nze, P. and Schulz, G. Low voltage counter tubes, 4156. A method of measurement of the thermal conductivity of fibrous substances, 6699

per, C. G. On the destruction of superconductivity by large currents, 1645

rata, M., Kikuchi, R. and Watari, T. A theory of cooperative phenomena. III. Detailed discussions of the cluster variation method, 2965

ratani, K. *See also* Mizushima, S.-I., 7258; Nakagawa, I., 1016

ratani, K., Miyazawa, T. and Mizushima, S. Energy difference in rotational isomers of some dihalogenoethanes in the gaseous and liquid states, 8037

rath, D. States of light nuclei from the *jj* coupling model, 1028

rbatov, J. D. *See* Cheng, L. S., 1067; Elliott, M. W., 403; Haskins, J. R., 1056, 1075

renev, V. Ya. *See* Al'tshuler, S. A., 5568

rgelaidze, D. *See* Ivanenko, D., 6471

ritsÿna, E. F. Magnetic viscosity of nickel-zinc ferrites, 5575. Temperature dependence of the magnetic viscosity of ferro-nickel alloys, 5577. *See also* Telesnin, R. V., 5576

roiwa, D. Electron-microscope study of fog nuclei, 5244

rshan, J. *See* Pantchechnikoff, J. I., 862

rsunoğlu, B. Gravitation and electrodynamics, 1359. *See also* Rickayzen, G., 2932

rth, B. The 'homologous' rule in the theory of stellar constitution, 5844

rth, R. On Schwarzschild's integral equation, 1349. The determination of density in the globular star clusters, 1350

rti, N. *See also* Ambler, E., 1587, 5653; Bishop, G. R., 1896; Daniels, J. M., 1841

Kurti, N. and Simon, F. E. On the use of γ-rays in low temperature calorimetry, 7634

Kurtz, M. *See* Mason, V. V., 1570

Kurtze, G. Investigation of sound absorption in aqueous solutions of electrolytes in the frequency range 3 to 100 Mc/s, 5916

Kusaka, R. *See* Itoh, J., 379*, 6139–40, 7038

Kusch, P. Dimerization in NaF, 8039. *See also* Coté, R. E., 4257; Koenig, S. H., 387; Ochs, S. A., 3490; Prodell, A. G., 385

Kushneriuk, S. A. Efficiency of the long boron counter for fast neutrons, 7191

Kushwaha, R. S. Adiabatic pulsations of a particular model of the variable star, 2917

Kustaanheimo, P. On the fundamental prime of a finite world, 4582

Kusumoto, O., Miyake, S., Suga, K. and Watase, Y. An example of multiple meson production observed with a high pressure hydrogen filled cloud chamber, 6124

Kutz, E. R. *See* Macht, S. H., 2867

Kuwabara, G. On the flare of lenses, 2313. On the fatigue of Ag-Cs photoelectric tubes, 4101. *See also* Ishiguro, K., 4718

Kuwabara, S. *See* Tazaki, H., 1264

Kuznetsov, A. Ya. *See* Gutkin, N. G., 6034

Kuznetsov, V. D. Anisotropy in mutual grinding of crystals, 1199. Mutual grinding of brittle solids, 6277

Kvitka, S. S., Kolontsova, E. V. and Umanskiĭ, M. M. Camera-monochromator for photographs of polycrystals (KMSP), 2072

Kyles, J., Campbell, C. G. and Henderson, W. J. An investigation of the β-particle spectrum of mesothorium 2, 7090

Laasonen, P. A generalization of the symmetrical kernel of an integral equation, 4555

Laberrigue-Frolow, J. *See also* Yuasa, T., 5295

Laberrigue-Frolow, J., Bernas, R. and Langevin, H. On the γ-radiation of $^{80}_{35}$Br (18 min), 5029

Labeyrie, J. *See also* Delibrias, G., 7856

Labeyrie, J. and Pellé, M. Recorder for radioactive aerosols (type E.A.R. 101), 7742

Labhart, H. Antiferromagnetism, 6932

Laboulaye, H. de. *See* de Laboulaye, H.

Labouret, J. and Lacroix, G. The temperature of electric arcs, 2471

Labrum, N. R. Some experiments on centimeter-wavelength scattering by small obstacles, 1780. The scattering of radio waves by meteorological particles, 1781

Labus, J. Space-charge waves in electron streams, 6965

Labus, L. Influence of the Lorentz force on the space-charge waves in electron beams, 4834

Lacam, A. Speed of ultrasonics in nitrogen at pressures up to 1150 atmospheres, 7525. On the ratio γ of the specific heats of nitrogen under pressure, 7643. Velocity of ultrasound in methane at pressures up to 950 atm., 8286

Lacam, A. and Noury, J. Velocity of ultrasound in argon up to pressures of 950 atmospheres, 3041. The ratio γ of the specific heats of argon at high pressures, 4773. Contribution to the study of ultrasonic dispersion in compressed gases, 7523. Ultrasonic velocities and ratio γ of the specific heats of argon and of nitrogen under pressure, 7642

Lacaze, A. and Peretti, J. Examination of the resistance of carbon for the measurement of very low temperatures, 7639

Lacey, R. F. *See* Bitter, F., 8632

Lacroix, G. *See* Labouret, J., 2471

Ladacki, M. and Szwarc, M. Dissociation energies of C-Br bonds in the bromo-naphthalenes, 9-bromophenanthrene, and 9-bromo-anthracene, 1000. Studies of the variations in bond dissociation energies of aromatic compounds. I. Mono-bromo-aryles, 8749

Ladell, J., Post, B. and Fankuchen, I. The crystal structure of nickel carbonyl, Ni(CO)$_4$, 7327

Laffineur, M. Radio astronomy, 6387

Laffitte, E. On the variation, with wavelength of excitation, of the degree of polarization of fluorescence of dyestuffs, 4722

Laffitte, P. *See* James, H., 5744–5

Lafont, R. Internal oscillations of the SO_4 ion in a monocrystal of $ZnSO_4 . 7H_2O$, 4729

Laforgue, A. The calculation of error in quantum chemistry, 3488. On "molecular diagrams" in atomic orbital methods, 5639. The methods of calculating dipole moments, 5646*. On the definition of atoms in the molecule and the systematization of diagrams, 6988. On the validity of the method of variations, 6989

Lafoucrière, J. Crooked trajectories for charged particles in a magnetic field with a plane of symmetry, 891. The limits of validity of the calculation by successive approximations of the axial and radial focusing in a prismatic beta spectrometer, 4852

Lafourcade, L. [Electron diffraction] study of grain size in thin films of gold, palladium, and gold-palladium alloy, prepared by thermal evaporation, 7971

Lagemann, R. T., Gilley, L. W. and McLeroy, E. G. The ultrasonic velocity, density, and compressibility of supercooled H_2O and D_2O, 5319

Lagemann, R. T., Jones, E. A., and Woltz, P. J. H. The infrared and Raman spectra of CF_3OF, 756

Lagerda, L. and Brot, C. The dielectric permittivity of solid hydrobromic acid at 10 000 Mc/s, 5459

Lagerqvist, A. A band-system of radium chloride, 3110. The band spectrum of calcium oxide in the violet and ultra-violet regions, 7562. *See also* Almkvist, G., 1505

Lagrenaudie, J. Electrical and optical properties of boron, 1641. A study of the properties of boron, 5468. Semiconducting compounds of boron with carbon and aluminium, 6774. *See also* Aigrain, P., 1635

Laidler, K. J., Wall, M. C. and Markham, M. C. Molecular kinetics of hydrogenation and exchange reactions of ethylene at surfaces, 7235

Laird, E. R. Dielectric properties of some solid proteins at wave lengths 1·7 meters and 3·2 centimeters, 6753

Laird, R. K. and Barrow, R. F. The ultra-violet band spectrum of carbon monoselenide, 8317

Lakatos, B. *See* Szabó, Z. G., 1580

Lakshmana Rao, S. K. and Ramakrishna, B. S. A trigonometric series used in physical problems, 2890

Lal, B. *See* Mukerji, S. K., 1552, 4034, 7598

Lal, H. Moving-boundary electrophoresis of colloidal electrolytes using concentration boundaries, 3322

Lalan, V. On the spatial rotation associated with a Lorentz cycle, 7417

Lalande, A. *See* Raoult, G., 5485

Lallemand, A. and Duchesne, M. Application to astronomy of an ideal photon receiver, 6

Lallement, C. *See* Berbezier, J., 5230

Lamarche, J. A variable phase-contrast microscope (Françon–Nomarski system), 3209

la Marre, P. H. de. *See* de la Marre, P. H.

Lamb, J. The behaviour of ultrasonics in liquids, 3043

Lamb, W. E., Jr. *See* Dayhoff, E. S., 1848; Triebwasser, S., 1847

Lambert, J. D. *See* Fogg, P. G. T., 8289

Lambot, H. and Vassamillet, L. Determination of lattice disorientations by diffraction of X-rays transmitted through monocrystals, 2074. On the deformation and polygonization of aluminium single crystals, 2076

Lambrechts, A. *See* Govaerts, J., 5751

Lamoral, R. *See* Pujolle, J. 97

Lampert, M. A. *See also* Goldstein, L., 2473

Lampert, M. A. and White, A. D. Microwave technique for studying discharges in gases, 8432

Lamphere, R. W. Fission cross section of uranium-234, 7936

Lamphere, R. W. and Robinson, G. P. A converted electron accelerator to produce 2·3 MeV positive ions, 1684

Lancaster, J. E. *See* Crawford, B. L., Jr, 4249

Landais, J. Sketch of the structure of tripthenylmethyl bromide, 3747

Landauer, R. and Swanson, J. Diffusion currents in the semiconductor Hall effect, 7671

Lander, J. J., Kern, H. E. and Beach, A. L. Solubility and diffusion coefficient of carbon in nickel: reaction rates of nickel-carbon alloys with barium oxide, 1174

Lander, R. L. and Nielsen, C. E. Scattering of l
from small drops, 2390

Landiya, N. A. and Mchedlov-Petrosyan, O. P.
thermodynamic investigation of the solid-ph
reactions in the system; calcium oxide-silica, 628

Landmark, B. *See* Harang, L., 8814

Landolt, M. Old and new definition of the idea
magnetic field, 6936

Landsberg, P. T. Semiconductor statistics, 8401

Landsman, D. A. *See* Everett, D. H., 2781

Landt, E. On the determination of adhesion tension
work of adhesion, 8727

Landwehr, R. Application of plastics to photoela
interference experiments, 4747. The testing
shape with micro-interference. A new sur
interferometer, 5982

Lane, A. L. Design techniques for a high freque
transducer with a wide-beam searchlight patt
6565

Lane, J. A. *See* Saxton, J. A., 833

Lane, M. R., Linnett, J. W. and Oswin, H. G. A st
of the $C_2H_4 + HCl = C_2H_5Cl$ and $C_2H_4 + HB$
C_2H_5Br equilibria, 4439

Lane, P. E. *See* Prowse, W. A., 8434

Lane, P. H. R. *See* Gross, N., 2983

Lane, R. N. *See* Botsford, J. H., 697

Lane, T. B. and Hughes. J. R. A study of the oil-
formation in gears by electrical resistance meas
ments, 1200

Lang, J. M. B. Nuclear disintegrations by slow nega
μ-mesons and photons, 2685

Lang, K. The spectral intensity distribution in a n
line for various discharge conditions, 4696

Lange, E. Fundamental energy principles of corros
2016

Lange, H. de. *See* de Lange, H.

Lange, P. W. de. *See* de Lange, P. W.

Langebartel, R. G. *See* Lindblad, B., 4572

Langer, L. M. *See also* Ames, D. P., 7077; Duffie
R. B., 2661; Graves, G. A., 425

Langer, L. M., Lazar, N. H. and Moffat, R. J.
Disintegration of Sb^{124}, 7081

Langer, L. M. and Moffat, R. J. D. The beta-spect
of tritium and the mass of the neutrino, 1066

Langevin, H. *See* Laberrigue–Frolow, J., 50
Marty, N., 4989

Langevin, M. An upper limit to the mean life of
11·7 keV excited state of $^{56}Ba^{133}_{77}$, 4983

Langford, D. A. *See* Martindale, R. G., 6306

Langleben, P. *See* Kerker, M., 5809

Langlo, K. On the amount of atmospheric ozone
its relation to meteorological conditions, 5233

Langstroth, G. O. *See* Gillespie, T., 2792

Langton, N. H. The two-dimensional magnetic
electric field above and below an infinite corrug
sheet, 6745. *See also* Davy, N., 7789

Lansraux, G. Instrumental diffraction. II. Gen
properties connecting pupil and diffraction patt
III. Intensity and phase at the focus. IV. Intensit
the outer areas of the diffraction pattern, 6672

Lanter, R. J. and Corwin, R. W. Spurious pulses f
the type 5819 photomultiplier tube, 287

Lanza, G. *See* Budini, P., 1713

Lanzl, L. H., Skaggs, L. S., Pingel, J. H. and R
J. E. Transmission of Co^{60} gamma-rays thro
thick uranium, 6216

Lapalme, J. *See* Demers, P., 6369

la Perrelle, E. T. de. *See* de la Perrelle, E. T.

Laporte, O. *See* Hollyer, R. N., Jr, 3946

Lapsley, A. C. Effect of space charge on satura
properties of ionization chambers, 8469

Larach, S. Intensification in zinc selenide phosph
4725. *See also* Bube, R. H., 1545*

Larach, S. and Turkevich, J. Interaction of m
ganese activator ions in zinc-orthosilicate phosph
3161

Larché, K. The arc form of high pressure discharge
the noble gases, 257

Larché, K. and Schirmer, H. On the determinatio
plasma temperatures in xenon high pressure
875

Larin, S. *See* Ivanenko, D., 6471, 7051

LaRiviere, P. D. and Ichiki, S. K. Autoradiogra
method for identifying beta-active particles i
heterogeneous mixture, 1078

rk-Horovitz, K. *See* Keesom, P. H., 1801
rnaudie, M. Infrared spectra of some disubstituted derivatives of cyclohexane. Structure considerations, 5763
rson, D. A. *See* Kenty, C., 1665
rson, E. V. and Mayer, R. Recording and indicating instruments for temperature measurements down to 10°K using copper-Constantan thermocouples, 1590
rson, R. R. *See* Birnbaum, G., 2858
skar, W. Semi-direct determination of the fluorescence yield of the *K* level of certain atoms from measurements of X-ray line breadths, 7706
slett, L. J. *See* Bureau, A. J., 1428; Jensen, E. N., 4999
sof, S. *See* Pantchechnikoff, J. I., 862
ssiter, L. W. *See* Hubbard, H. H., 5359
szló, Z. The influence of a direct-current electric field on the adhesion tension, 1414
tham, D., Power, B. D. and Dennis, N. T. M. An assessment of some working fluids for diffusion pumps, 6539
uber, A. Acoustic resonators as sound absorbers, 1474. *See also* Furrer, W., 2302
udet, M. Numerical calculation of the potential and flux due to a uniformly charged disk, 1603. Potential and field of a cylindrical electrostatic lens with three apertures, 5513*
udet, M. and Pilod, P. The potential in an electrostatic electron lens. Comparison of numerical calculations and measurements made in the electrolytic trough, 7715
ue, M. von. *See* von Laue, M.
uer, O. Laminar and turbulent stationary streams of air and CO_2 in a slightly conical tube in the neighbourhood of the critical Reynolds number, 6535
ughlin, J. S. *See* Haas, L. L., 2861
urent, H. and Simonnin, P. Preparation of ^{76}As from cacodylic acid by the Szilard [–Chalmers] reaction, 7905
urent, P. *See* Kovacs, A., 1188
urikainen, K. V. Asymptotic eigensolutions of the radial deuteron equation, 4619
urikainen, K. V. and Euranto, E. K. Contributions to the numerical treatment of the Schrödinger equation for the Yukawa potential, 7450
uritsen, C. C. *See* Kraus, A. A., Jr, 1907; Warters, W. D., 7919
uritsen, T. *See* Ajzenberg, F., 2604; Thomas, R. G., 1112
uterjung, K. H. *See* Niklas, L., 6220
utz, G. On the theory of the differential thermoelectric power of semiconductors, 7692. *See also* Justi, E., 1638, 3306
aval, J. Intensity of X-rays scattered by thermal agitation of atoms, 7300
avine, L. R. Corrections to Grison's paper on the Harker–Kasper inequalities and to Zachariasen's paper on the 'Statistical method,' 7312
aViolette, F. G. *See* Stewart, H. B., 7158
awrance, R. The temperature dependence of drift mobility in germanium, 4801
awrance, R. and Gibson, A. F. The measurement of drift mobility in semi-conductors, 3300
awrence, E. O. *See* Foster, J. S., Jr, 5898
awrence, R. S. Continental maps of four ionosphere disturbances, 5812
awson, D. I. and Simms, D. L. Ignition of wood by radiation, 3249
awson, J. D. Radiation characteristics of high-energy electron accelerator targets, 2493. A diffraction effect illustrating the transparency of nuclei to high energy neutrons, 5725. *See also* Adams, J. B., 6857
awson, J. R. *See* Fuson, N., 138
awson, J. S., Jr and Frauenfelder, H. The correction for finite angular resolution in directional correlation measurements, 7858
awson, R. D. and Drell, S. D. Double meson photoproduction, 5719
awton, E. J.; Bueche, A. M. and Balwit, J. S. Irradiation of polymers by high-energy electrons, 7254
ax, M. The Franck-Condon principle and its application to crystals, 1247. *See also* Rosenberg, R., 3428
ax, M. and Feshbach, H. Photoproduction of mesons in deuterium, 1146
Lax-Weiner, K. and Schoenfeld-Reiner, R. The Weissenberg effect in blown bitumen, 1197
Lazar, N. H. *See* Langer, L. M., 7081
Lazarev, B. G. *See* Esel'son, B. N., 5441
Lazarus, D. *See* Slifkin, L., 1959
Leach, S. *See* Florent, R., 734
Leader, D. Electrical breakdown in vacuum, 249, 7697
Leaderman, H. and Marvin, R. S. Dynamic compliance, dynamic modulus and equivalent Voigt and Maxwell models for polyisobutylene, 7206
Leadon, B. M. *See* Werner, F. D., 3179
Leaf, B. The continuum in special relativity. II, 5847
Lebas, J.-M. *See* Josien, M.-L., 2595
Lebedev, V. *See* Ivanenko, D., 618
Lebedinskiĭ, A. I. Gravitational condensation of stellar gas and the formation of star clusters, 5281
LeBlanc, J. M. *See* Cork, J. M., 1054, 4304, 4995, 5000, 7079
Leboeuf, M. B. *See* Miller, D. G., 6881
Le Borgne, E. Terrestrial magnetism. The magnetic susceptibility of soil, 1272. *See also* Henin, S., 5792
Le Bot, J. *See also* Le Montagner, S., 381
Le Bot, J., and Le Montagner, S. A new method of measurement of the complex dielectric constant of solids and liquids at centimetre wavelengths. Results of measurement of dielectric constants at 9500 Mc/s by a new method, 5464
Le Bot, J. Le Montagner, S. and Allain, Y. Study at 9500 Mc/s of the phase transitions of some alkaline phosphates and arsenates, 6755
Le Bouffant, L. Method of collection and observation of atmospheric powders without modification of their state of agglomeration, 8123
Le Bouffant, L. and Soulé, J.-L. Automatic method of granulometric analysis, 1403
Lechno-Wasiutynska, Z. Energy loss of highly charged particles produced by fission and by cosmic rays. IV. The linear density of delta rays. Theoretical, 5529. *See also* Demers, P., 1064, 5529
Leck, J. H. Sorption and desorption of gas in the cold-cathode ionization gauge, 6543
Le Claire, A. D. Diffusion in metals, 3630, 7969
Lecolazet, R. *See also* Hée, A., 5231
Lecolazet, R. and Hée, A. On the measurement of the radioactivity of the atmospheric air with the aid of a gammameter, 5251
Lecomte, J. Infra-red spectrometry and its recent progress, 730. *See also* Duval, C., 3679; Manneback, C., 1001; Pain, C., 7567; Pobeguin, T., 7268
Le Corbeiller, P. and Yeung, Y.-W. Duality in mechanics, 1441
Le Corre, Y. Determination of the seven dynamic elastic constants of ammonium dihydrogen phosphate, 7991
Le Couteur, K. J. Perturbations in the magnetic deflector for synchro-cyclotrons, 3364
Lecuir, R. Control of the chemical action of the beam during the recording of electron diffraction patterns. The case of hydrated cobaltous chloride, 1232
Leddicotte, G. W. *See* Reynolds, S. A., 7105
Lederer, M. *See* Michalowicz, A., 5709
Ledinegg, E. and Urban, P. On the group-theoretical treatment of the linear atomic chain, 2590. The zero-point of a linear antiferromagnetic atomic chain, 4902
Ledoux, P. Note on the periods of pulsation of stars of high mass concentration and the problem of the Cepheids, 4575. The existence of a convective core at the centre of stars, 7408
Lee, E. W. Magnetostriction of some ferromagnetic alloys, 3471. Magnetostriction, 3472. The influence of domain structure on the magnetization curves of single crystals, 6961
Lee, J. F. Partition functions for relating entropy to disorder in the melting of pure metals, 3003
Lee, J. H. Vacuum tube molecular emission and dissociation spectra, 6824
Lee Po. *See* Po Lee.
Lee, R. J. *See* Fowler, R. G., 251
Lee, T. D., Low, F. E. and Pines, D. The motion of slow electrons in a polar crystal, 4475
Lee, T.-D. and Pines, D. The motion of slow electrons in polar crystals, 1248
Leela, M. *See* Ramachandra Rao, S., 6954

Lees, C. F., Morrison, G. C., Muirhead, H. and Rosser, W. G. V. The cross section for star production in nuclear emulsions by 130 MeV protons, 4348

Lees, C. F., Morrison, G. C. and Rosser, W. G. V. The range-energy relation for protons and alpha-particles in diluted Ilford G5 emulsions, 3370

Lees, J. F. *See* Cwilong, B. M., 190

Lees, R. *See* Hennig, G., 4450

Leeuwen, C. J. van. *See* van Leeuwen, C. J.

Le Foll, J. and Kadosch, M. Definition and properties of inert flows, 2230

Lefort, M. Oxidation of ferrous sulphate in sulphuric acid by the radiations from radon and its active deposit, 8028

Léger, E. G. and Ouellet, C. Kinetic studies with a fast-scanning mass spectroscope, 8009

Leger, P. *See* Prugne, P., 1176

Legrand, C. and Delville, J. The crystal parameters of rutile and anatase, 5214

Legrand, C., Tertian, L. and Tertian, R. Study of boehmite-hydrargillite mixtures, 3741

Legros, R. On the radiation emitted, in various wavelength ranges, by condensed discharges in xenon and krypton, 250

Legvold, S. *See also* Elliott, J. F., 6959

Legvold, S., Spedding, F. H., Barson, F. and Elliott, J. F. Some magnetic and electrical properties of gadolinium, dysprosium and erbium metals, 8554

Lehmann, H. Radiative corrections to meson production by photons, 1941

Lehmann, J. F. The biophysical mode of action of biologic and therapeutic ultrasonic reactions, 2276

Lehovec, K. New photoelectric devices utilizing carrier injection, 861. On the temperature dependence of the optical absorption of β-Ag_2S, 2338. Space-charge layer and distribution of lattice defects at the surface of ionic crystals, 7298

Lehovec, K., Accardo, C. A. and Jamgochian, E. Light emission produced by current injected into a green silicon-carbide crystal, 1554

Lehovec, K., Rosen, J., MacDonald, A. and Broder, J. Evaporation of germanium films from a carbon crucible, 5439

Lehovec, K., Soled, J., Koch, R., MacDonald, A. and Stearns, C. Apparatus for crystal pulling in vacuum using a graphite resistance furnace, 8768

Leibfried, G. Dislocations in anisotropic material, 8058

Leibfried, G. and Brenig, W. The specific heat of solids, 6016

Leibowitz, H. *See* Brown, J. L., 4531

Leide, G. *See* v. Friesen, S., 4893

Leidheiser, H., Jr. *See* Kehrer, V. J., 4764

Leifer, H. N. *See* Hershberger, W. D., 972, 8564

Leighton, G. J. Radioactive thickness gage controls paper weight, 2683

Leighton, R. B. *See also* Alford, W. L., 5108; York, C. M., 5104

Leighton, R. B., Wanlass, S. D. and Anderson, C. D. The decay of V^0 particles, 1943

Leimanis, E. On the motion of a point mass in a resisting medium of variable density, 4626

Leipuner, L., Seigel, R. and DeBenedetti, S. Polarization of the three-photon annihilation radiation, 7115

Leisegang, S. On astigmatism in electron lenses, 4846

Leist, M. *See* Falkenhagen, H., 2785

Leistner, K., Marcus, B. and Wheeler, B. W., Jr. Lens testing bench, 1566

Leiter, H. *See* Brucer, M., 4536

Lejay, P. The 10th General assembly of the U.R.S.I. [Introduction], 6968

Lemaître, G. Clusters of nebulae in an expanding universe, 2146

LeMay, C. Z. *See* Jaffé, G., 5453

Lemmer, H. R. *See* Ambler, E., 5653

Lemmerman, R. D. Materials and structures problems in aircraft noise control, 5367. *See also* Callaway, D. B., 5355

Lemmlein, G. G. The migration of a liquid inclusion in a crystal in the direction of a source of heat, 5192. The envelopment of obstacles by the front of a growing layer of a crystal face, 5768

Le Montagner, S. *See also* Le Bot, J., 5464, 6755

Le Montagner, S., Le Bot, J. and Allain, Y. T complex dielectric constant at 9500 Mc/s of so phosphates as a function of temperature, 831

Lempicki, A. The electrical conductivity of MgO sin crystals at high temperatures, 4798. The origin secondary emission electrons, 4859

Lenard, A. Inner bremsstrahlung in μ-meson dec 6238

Lennard-Jones, J. *See* Hurley, A. C., 3510, 7012

Lennox, E. S. *See* Kloepper, R. M., 1074

Lennuier, R. and Cojan, J.-L. New measurements the spectral intervals which separate the hyperfi components of the mercury line λ 2537, 31 Measurements of the reflection factor of a lens silica containing mercury vapour in the region the resonance wavelength λ 2537 Å, 5416

Lenoble, J. Optical method of studying the shape o reflecting surface, 3965. The light absorption of t crystalline lens in the infrared, 8142

Lenormant, H. Structure of proteins in solution a structural modifications produced by denaturati 3132

Lenouvel, F. *See* Bigay, J. H., 7404

Lenz, F., The magnetic lens as velocity analyser, 484 The incoherent scattering of X-rays, 8440. *See a* v. Borries, B., 4844

Lenz, F. and Hahn, M. Investigation of the asymme of magnetic pole-piece lenses with weakly su telescopic [unterteleskopischen] ray paths, 4842

Leo, W., Schleicher, H. and Stübenrath, K. Spec screw socket for use in the precise measurement filament lamps, 6587

Leonardis, M. T. De. *See* De Leonardis, M. T.

Leondes, C. and Rubinoff, M. DINA, a digital analys for Laplace, Poisson, diffusion, and wave equatio 2142

Leontic, B. and Wolfendale, A. W. A count hodoscope study of associated penetrating partic underground, 2529. The anomalous scattering μ-mesons in lead, 8703

Leontovich, M. A. and Rȳtov, S. M. The differenti law of the intensity of electric fluctuations and t influence of the skin effect on them, 5466

Lépéchinsky, D. The ionosphere and wave propagatio 6976

Lepeshinskaya, V. N. *See* Dobretsov, L. N., 939

Lepore, J. V. Symmetrical pseudoscalar meson theo of nuclear forces, 622

Leppard, R. E. *See* Gowan, E. H., 7348

Lepri, F. *See* Alberigi, A., 1704

Leprince-Ringuet, L. *See* Crussard, J., 5560, 7173

Lepsius, R. and Asunmaa, S. K. Principal consideratio in the periodic system of the elements. V, VI, V 6186

Le Roy, D. J. *See* Brandy, J. H., 7252

Leroy, N. *See* Debure, M., 3963

Lesensky, L. and Boorse, H. A. Helium film transpo over copper below 1°K, 191

Lesk, I. A. *See* Weise, E. K., 6771

Lesquibe, F. and Giacomo, P. Measurement of t index of refraction of thin absorbing layers und normal incidence. Application to carbon, 6668

Letort, M. *See* Fillet, P., 5743

Leuba, P. and Anthony, J.-P. Study of fluorescen excited in zinc sulphide by α-particles using photoelectron multiplier, 4735

Le-Van-Thoi. On the technique of the Raman effect resinic acids and of their derivatives, 7599

Levee, R. D. A gravitationally contracting stellar mod 3836

Lévèque, A. *See* Barloutaud, R., 1139; Valladas, C 3382

Levey, G. *See* Hornig, J. F., 515

Levgold, S. *See* James, N. R., 840

Levi, C. *See* Berthelot, A., 7089

Levi, H. Improved α-track autoradiographs of bi logical specimens, 2875

Levi, L. On a criticism of the law of induction, 4920

Levi, R. New dispenser type thermionic catho 3400

Levin, J. S. and Hughes, D. J. Flux depression and se protection in the production of radiocobalt, 8690

Levin, M. L. On the dispersion of sound in a sligh non-homogeneous medium, 85

ine, S. The free energy of the double layer of a colloidal particle and the charging process, 5161. Interaction of two parallel colloidal plates using a modified Poisson–Boltzmann equation, 5162
ine, S. W. *See* Beattie, J. A., 74
inger, J. S. Effects of radioactive disintegrations on inner electrons of the atom, 4332
inson, N. Certain explicit relationships between phase shift and scattering potential, 2209
itskiĭ, M. P. On the theory of isothermal growth of crystalline grains in metallic alloys, 6245
y, A. L. Ionic hydration and Stokes' law, 5184
y, H. A. *See also* Waser, J., 8101
y, H. A. and Peterson, S. W. Neutron diffraction study of the NaCl-type modification of ND_4Br and ND_4I, 3756
y, M. M. Non-adiabatic treatment of the relativistic two-body problem, 38. Meson theory of nuclear forces and low energy properties of the neutron-proton system, 621
y, S. and Truell, R. Ultrasonic attenuation in magnetic single crystals, 8602
y, S. L. *See* Ying, C. F., 1165
Hin. *See* Hin Lew.
vis, E. A. *See* Casey, J. P., Jr, 1560*
vis, G. L. *See* de Waele, A., 8726
vis, G. M. The natural radioactivity of rubidium, 1867
vis, G. M. and Ferguson, A. T. G. On the annihilation spectrum of positrons in freon and oxygen, 7902
vis, H. W. Multiple meson production in nucleon-nucleon collisions, 2735
vis, H. W., Simmons, B. E. and Merzbacher, E. Production of characteristic X-rays by protons of 1·7- to 3-MeV energy, 7920
vis, H. W. and Wannier, G. H. Spherical model of a ferromagnet, 952*
vis, P. H. and Rundle, R. E. Electron deficient compounds. VII. The structure of the trimethylaluminum dimer, 6301
vis, R. E., Betz, H. T., Rodelius, N. W. and Wolfson, M. The generation of high aperture parabolic surfaces of revolution, 171
vis, R. P. W. The reflection of radio waves from an ionized layer having both vertical and horizontal ionization gradients, 4935
vis, R. P. W. and McIntosh, D. H. Geophysical and meteorological changes in the period January–April 1949, 564
s, J. A. A method for simultaneously measuring the velocity of a fluid and sampling the fluid from the point of measurement, 1435
rmitte, R. The upper bands in the vertical structure of rain echoes, 2849
C. W. Nuclear mass determinations from disintegration energies: oxygen to sulfur, 1042*
Kam. *See* Kam Li.
ndrat, G. *See* Aigrain, P., 1635
ng, C. Y. *See* Nielsen, J. R., 3142, 5961–2
by, W. F. Radiocarbon dating, 1276. The potential usefulness of natural tritium, 5805. *See also* Sugihara, T. T., 1224, 6879
en, W. and Goldberg, B. A new line board test for paraboloidal reflectors, 4751
erman, A. M. *See* Cooper, F. S., 713*
n, I. Sh. *See* Vul'fson, K. S., 5991
htin, N. N. *See* Thomas, G. R., 2036, 8251
htman, S. W. Pulsed G-M tube operation, 4155
klider, J. C. R. On the process of speech perception, 706
del, U. Phantasmagoria or unusual observations in the atmosphere, 4509
e, D. R., Jr. Preliminary analysis of the pure-rotational spectrum of methyl amine, 751*. A note on rotational line strengths in slightly asymmetric rotors, 1002*. The microwave spectrum and structure of methylene fluoride, 3136
iard, A. B. Spin degeneracy and the theory of collective electron ferromagnetism, 1738. Overlapping energy bands and the theory of collective electron ferromagnetism, 4203. On a minimum property of the free energy, 8608
ofsky, L. *See* Wu, C. S., 412
Liebmann, G. Electrical analogues, 7474. The effect of pole piece saturation in magnetic electron lenses, 7717
Liebson, S. H. *See* Bishop, M. E., 7278; Garstens, M. A., 325; Hall, W. C., 4159
Liehr, A. D. *See* Gutowsky, H. S., 136
Lien, R. H. Radiation from a horizontal dipole in a semi-infinite dissipative medium, 1785
Liepmann, H. W. Aspects of the turbulence problem, 646
Lieshout, R. van. *See* Van Lieshout, R.
Liesse, C. On the theory of nuclear shells, 1032
Lifshits, I. M. and Rozentsveĭg, L. N. Theory of steam-jet vacuum pumps, 5899
Lighthill, M. J. On the squirming motion of nearly spherical deformable bodies through liquids at very small Reynolds numbers, 649. On boundary layers and upstream influence. I. A comparison between subsonic and supersonic flows, 4657; II. Supersonic flows without separation, 6546. On the energy scattered from the interaction of turbulence with sound or shock waves, 8295
Lilley, G. M., Westley, R., Yates, A. H. and Busing, J. R. The supersonic bang, 7510
Lillie, A. B. *See* Bonner, T. W., 1117
Lima-de-Faria, J. Formation of macroscopic electric charges in the interior of solutions, 2431. Calculation of electric charges formed in the bulk of solutions for regions with very strong discontinuities of the electric field, 2432. Application of potassium permanganate for rendering visible electrical charges produced during diffusion, 3007*. Effects of the macroscopic electrical charges formed in the interior of solutions and their importance in electrolytic processes, 7245. Demonstration, in a visible manner, of the macroscopic electric charges formed within solutions in discontinuous regions of the electric field, 8012
Limber, D. N. Fluctuations in brightness of the Milky Way, 3823
Lin, S.-C. *See* Resler, E. L., 681
Lin, S. T. and Kaufmann, A. R. Helmholtz coils for production of powerful and uniform fields and gradients, 8582
Lin Hwang Jenn. *See* Jenn Lin Hwang
Lind, S. C. Review of electrochemistry of gases, 8021
Lindberg, A., Neuert, H. and Weidner, H. On a resonance effect in electrodeless high frequency gas discharges in a superimposed magnetic field, 872
Lindberg, O. Hall effect, 985
Lindberg, P. J. A collimator with variable focal length and tilted test plate for testing cameras, 574
Lindblad, B. and Langebartel, R. G. On the dynamics of stellar systems, 4572
Lindblad, B.-A. A radar investigation of the delta Aquarid meteor shower of 1950, 6391
Linde, J. O. *See* Gerritsen, A. N., 2443
Lindenbaum, S. J. *See* Bernardini, G., 1106
Lindenfeld, P., Sachs, A. and Steinberger, J. The internal pair production of γ-rays of mesonic origin; alternate modes of π^0 decay, 2740
Lindenmeyer, P. H. and Harris, P. M. The infrared spectra of tetranitromethane, 3131
Linder, E. G. and Christian, S. M. The use of radioactive material for the generation of high voltage, 428
Linder, E. G. and Rappaport, P. Radioactive charging through a dielectric medium, 6848
Lindhard, J. Resistance-independent absorption of light waves by metals, and the properties of ideal conductors, 8394
Lindholm, E. The vibrations and bending of prestressed circular plates, 4624. *See also* Klemm, A., 1216
Lindig, O. *See* Eckardt, A., 8282
Lindner, L., Scott, W. E. and Stephens, E. R. Formation and excitation of atomic sodium in hydrogen diffusion flames, 2319
Lindner, M. Heavy isotopes of magnesium and silicon, 4302. New nuclides produced in chlorine spallation, 7876
Lindner, M. and Osborne, R. N. The nuclides Ba^{127}, Ba^{128}, and Cs^{128}, 1871. The cross section for the reaction $Al^{27}(\alpha, \alpha 2pn)Na^{24}$ from threshold to 380 MeV, 7125

Lindner, R. Diffusion of radioactive iron in iron (3) oxide and zinc-iron-spinel, 4403. Auto-diffusion in lead oxide, 5121. *See also* Brune, U., 5158; Garcia-Verduch, A., 4405; Hedvall, J. A., 4402
Lindqvist, I. The structure of the hexaniobate ion in $7 Na_2O.6 Nb_2O_5 . 32 H_2O$, 5219
Lindqvist, T. Precision measurements of the gamma-radiation from scandium^{46}, 1894
Lindsay, P. A. and Sims, G. D. Application of the thermodynamics of irreversible processes to the theory of the magnetron, 8476
Lindsay, R. B. [Conf. rep.]. Symposium on ultrasonic absorption in fluids at Brown University (October, 1952), 3949
Lindström, G. *See also* Slätis, H., 1670
Lindström, G., Hedgran, A. and Alburger, D. E. Precision measurement of Co^{60} gamma-radiation, 4323
Lindström, G., Siegbahn, K. and Wapstra, A. H. A precision measurement of the ^{137}Cs γ-line, 3564
Linfoot, E. H. and Wolf, E. Diffraction images in systems with an annular aperture, 3087
Link, W. T. *See also* Walker, D., 1104
Link, W. T. and Walker, D. Light output of potassium iodide crystals under bombardment by heavy charged particles, 8338
Linnell, R. H. The system pyridine-pyrrole and hydrogen bonding, 3513
Linnenbom, V. J. Separation of high specific activity sodium^{22} from large quantities of magnesium, 498
Linnett, J. W. *See* Lane, M. R., 4439
Linz, A., Jr. Some electrical properties of strontium titanate, 8389. *See also* Beals, M. D., 828
Lion, A. On some new recurrence relations between molecular distribution functions, 8263
Lion, K. S. A method of increasing photographic sensitivity by electrical discharges, 4545
Lippert, E. Apparatus developments in infrared spectroscopy. I.–II, 5953
Lippert, W., and Pohlit, W. On the determination of the electron optical characteristics of electrostatic lenses, 1678
Lippincott, E. R. and Nelson, R. D. The vibrational spectra and structure of ferrocene and ruthenocene, 6618
Lippmann, B. A. Note on the theory of gratings, 5983; *See also* Halpern, O., 394
Lippold, O. C. J., Naylor, P. F. D. and Treadwell, E. E. E. A dynamometer for the human calf muscles, 570
Lipscomb, W. N. Solutions of sodium in liquid ammonia, 2245. *See also* Atoji, M., 2600, 8069, 8103; Reed, T. B., 8115; Zaslow, B., 7328
Lipsicas, M. *See* Allen, K. R., 7371
Lipson, H. *See also* Hanson, A. W., 7316
Lipson, H. [Conf. rep.]. Summarized proceedings of the fortieth anniversary celebrations of the discovery of X-ray diffraction—London, October 1952, 3734
Lisan, P. *See* Agnew, J. T., 1318
Lisenkov, A. A. *See* Netushil, A. V., 8378
Lisin, V. I. Luminescence of calcium compounds, 3151
Listengarten, M. A. *See* Sliv, L. A., 3566
Lister, N. W. *See* Nash, K. L., 1652
Litherland, D. *See* Addison, C. C., 4115
Litovitz, T. A. and Sette, D. Dielectric and ultrasonic relaxation in glycerol, 1456
Littauer, R. *See* Keck, J., 448
Little, C. G. *See* Burrows, K., 7392
Little, K. Irradiation of linear high polymers, 2024
Little, R. N. *See* Forbes, S. G., 6242
Little, R. N., Jr. *See* Dvorak, H. R., 5085
Little, V. I. A standing wave method for measuring electromagnetic absorption in polar liquids at frequencies of the order 3×10^9 c/s, 3467. An analogue computer employing the principle of the Kelvin bridge, 3790
Littlefield, T. A. and Turnbull, D. T. Argon vacuum wave-length measurements, 6608
Littler, D. J. *See also* Aitken, K. L., 1130
Littler, D. J. and Lockett, E. E. The measurement of an absolute thermal neutron density in G.L.E.E.P., 5096. The pile neutron absorption cross sections of bismuth, 7153
Littler, D. J. and Thomas, R. H. Absolute neutron density determinations using cobalt, 5117
Littlewood, D. E. Conformal transformations a kinematical relativity, 4585
Litvinova, P. S. On the quenching of photoluminescen in zinc sulphide, 3154
Liu, I. D. *See* Giguère, P. A., 2592
Livesey, D. L. and Smith, C. L. Resonance effects the photo-disintegration of ^{16}O nuclei into fo α-particles, 444. Photodisintegration processes light even-even nuclei yielding alpha-particles, 714
Livingston, M. S. Strong-focusing synchrotron design and cost data, 4865. *See also* Couran E. D., 907, 7729
Livingston, R. *See also* Zeldes, H., 8321
Livingston, R. and Zeldes, H. The quadrupole mome ratio of I^{129} and I^{127} from pure quadrupole spect 4966
Livingston, R. L. *See* Hoffman, C. W. W., 4268
Llewellyn, D. R. Some physical properties of uraniu hexafluoride, 4634. *See also* Dostrovsky, I., 3707
Llewellyn Jones, F. *See* Jones, F. Llewellyn.
Lloyd, H., Simmons, A. T. F. and Winder, G. E. angle comparator for laboratory use, 2223
Lloyd, J. T. The stomach counter, 7738
Lloyd, S. P. Explicit γ-γ angular correlations. II. Pola zation correlations, 1085
Loar, H. H. *See* Durbin, R. P., 471; Goodell, W. Jr, 2692
Lobanov, E. M. *See* Angelov, B. P., 7676
Löbell, D. The application of the so-called Vo luminescence in spectrum analysis, 5943
Locher, K. and Stoll, P. The (γ, α) reaction of and B^{10}, 5072
Lochet, R. Contribution to the study of the molecu scattering of light (Rayleigh effect) in dilute solutio of strong electrolytes, 4744
Lochte-Holtgreven, W. *See also* Burhorn, F., 842
Lochte-Holtgreven, W. and Nissen, W. Electr affinity spectrum of neutral H_2, 1710
Lochte-Holtgreven, W. and Schilling, P. T generation of magnetic fields in rotating plasm 8428
Locke, J. L. and Herzberg, L. The absorption due carbon monoxide in the infrared solar spectrum, 4
Lockett, E. E. *See also* Aitken, K. L., 1130; Litt D. J., 5096, 7153
Lockett, E. E. and Bowell, E. The thermal neut absorption cross section of scandium, 3604
Lockett, E. E. and Thomas, R. H. The half-lives several radioisotopes, 4982
Lockhorst, D. A. *See* Franken, B., 3318
Locquin, M. Phase contrast with interference filt 3208. *See also* Bessis, M., 3226
Loeb, L. B. Secondary processes active in the electr breakdown of gases, 245. Current increase at c stant amplification factor in steady corona v coaxial cylindrical geometry, 4121
Loening, E. E. and Farnell, G. C. The photograp behaviour of the silica/silver-ion system, 2874
Lœuille, E. Experimental determination of the ratio the specific heats of gases arising from the comb tion of explosive powders, 4772
Loferski, J. J. Optical polarization in single crystal tellurium, 145
Lofgren, E. J. *See* Foster, J. S., Jr, 5898
Logan, J. K. and Marcus, J. A. Hall effect in crystals at low temperatures, 1793
Logan, R. A. Thermally induced acceptors in si crystal germanium, 8405
Loinger, A. A simple model of two interacting fie 7426*. On the solution of the Dirac–Corben ec tion, 8227. *See also* Bellomo, E., 8228
Loiseleur, J. and Petit, M. Inhibiting action of oxy acceptors on the effect of ultrasonics, 5761
Lomer, W. M. and Morton, K. W. The electrost energy of boron nitride, 7815
Lončar, J. Experimental investigations on some vacuum systems, 4650
Lonchamp, J. P. On the range-energy curves for posi ions of charge greater than 1 in nuclear emulsi 5530
London, A. *See* Jones, E., 2303
London, F. *See* Chen, T. C., 3254
Long, D. A. Intensities in Raman spectra. I. A b polarizability theory, 4731

, E. and Meyer, L. The unsaturated helium film, 440. Note on the adsorption of helium on glass, 369
, F. A. *See also* Kokes, R. J., 656
, F. A., Bagley, E. and Wilkens, J. Anomalous iffusion of acetone into cellulose acetate, 8271
, F. J. and Sykes, K. W. The effect of specific atalysts on the reactions of the steam-carbon ystem, 2008. The catalysis of the carbon monoxide-team reaction, 2009
, J. K. *See* Kundu, D. N., 4343
, J. V. P. Archeological dating by radiocarbon neasurements, 2839
champ, J. *See* Cüer, P., 2881
don, L. W. Noncentral force matrix elements for he nuclear d^2 configuration, 6480
sworth, L. G. Electrochemistry in biology 1902–52), 7239
uet-Escard, J. *See also* Mering, J., 5210
uet-Escard, J. and Mering, J. On the growth of rystallites in nickel hydroxide sols, 7281
uet-Higgins, M. S. Mass transport in water waves, 2997. On the decrease of velocity with depth n an irrotational water wave, 8259
dale, K. *See* Bacon, G. E., 3626; Bijvoet, J. M., 484
dale, K. *See* Henry, N. F. M. [Eds.], 8064
bourow, J. R. *See* Mohler, N. M., 765
is, R. S. *See* Zelikoff, M., 176
ey, F. S. *See* Rabinovitch, B. S., 1229
es, R. *See* Jansen, C. G. J., 4890, 7747
r, G. B. *See* Clewell, D. H., 7341
khin, V. M. *See* Vasil'ev, E. I., 6873
, J. J. *See* Backus, M., 1940
, N. W. On the kinetics of the disorder-order ransformation in Cu_3Au, 4408
, R. C. Synthesis of cyclobutene-d_6 and cyclo- utane-d_8, 4438. *See also* Corrsin, L., 6621
, R. C. and Merrifield, R. E. Strong hydrogen onds in crystals, 2798
nson, R. E. *See* Todd, S. S., 3267
nz, W. Generation of the electrochemical potential on the metal/electrolyte boundary surface, 2784
, A. *See* Cresti, M., 8474, 8494
ers, J. *See* Blandin, J., 7269
ng, R. A. *See* Green, J. B., 3986
ie, Y. *See* Vacher, M., 6598
he, A. A contribution to the theory of dipole iquids. I. Theoretical studies, 5893; II. Experi- nental investigations, 8264
ng, F. P. *See* Ingold, K. U., 4442, 8008
ette, P. The theory of Kuhn of the natural rota- ory power, 5428. *See also* Servant, R., 5583
sbury, M. *See* MacKenzie, D. R., 5673
verse, P. *See* Michels, A., 6537
ti, A., Mura, A., Tagliaferri, G. and Terrani, S. A cloud chamber analysis of cosmic rays at 3500 netres. I. The electronic component from nuclear lisintegrations in lead, 7761
erg, R. H. *See* Yarnell, J. L., 4355
, G. R. *See* Welsh, H. L., 6660
, R. J. The influence of surface condition on the atigue strength of steel, 4400
joy, D. R. *See* Atkins, K. R., 6007
land, J. W. and Elving, P. J. Cathode-ray scilloscopic investigation of phenomena at olarizable mercury electrodes, 526
ll, D. J. The concept of radiation measurements, 7537. *See also* Beck, C. J., 6332
ra, G. A formula for the oscillation frequencies of liatomic molecules of alkali metals, 4251. On the scillation frequencies of diatomic molecules con- aining atoms of the 4th, 5th, 6th, and 7th groups, 4252
B. W. and Richards, F. M. Determination of rotein crystal densities, 529
F. Natural line shape, 384. *See also* Bethe, H. A., 7903
F. E. *See also* Lee, T. D., 4475
F. E. and Pines, D. The mobility of slow electrons n polar crystals, 6767
an, A. N. [Compiled by]. Tables of arctan *x*, 6379
e, R. D. Diffuse reflection of neutrons from a ingle crystal, 1158
Löwdin, P.-O. On the molecular-orbital theory of conjugated organic compounds with application to the perturbed benzene ring, 3509. Approximate formulas for many-center integrals in the theory of molecules and crystals, 4247. Studies of atomic self-consistent fields. I. Calculation of Slater functions, 4296
Lowe, D. S. *See* Talley, R. M., 1663
Lowe, E. J. *See* Corbridge, D. E. C., 1258
Lozano, J. M. and Medina, F. M. Compton operator, 609. Boundary conditions and *S* [matrix] formalism of nuclear dispersion, 4607
Lubchenko, A. F. *See* Glauberman, A. E., 5456
Luborsky, F. E. *See* Hoffman, J. D., 828
Lucas, H. F. *See* Berlman, I. B., 6361
Lucas. I. The conductivity of the ionosphere and geomagnetic variations, 8120
Lucas, J. Santos. *See* Santos Lucas, J.
Lucas, L. N. D. Oriental chemical growth on single crystals of zinc and cadmium, 2043
Luce, R. G. and Trischka, J. W. Molecular constants of cesium chloride by the molecular beam electric resonance method, 1806
Luck, W. Optical effective diameter in iodine vapour mixtures, 3106
Luckey, D. An excitation curve for photomesons from beryllium, 6227
Luckey, G. W. *See* Groh, H. J., Jr, 2367
Lucy, F. A. *See* Koski, W. S., 643
Ludeke, C. A. and Evans, R. T. A coupling analog for nonlinear systems with more than one degree of freedom, 3450
Ludeke, C. A. and Morrison, C. L. Analog computer elements for solving nonlinear differential equations, 2898
Ludeke, C. A. and Pong, W. The extinction of predominantly subharmonic oscillations in nonlinear systems, 2557
Lüders, G. On reversal of the motion in quantized field theory, 1375
Ludford, G., Polachek, H. and Seeger, R. J. On unsteady flow of compressible viscous fluids, 3902
Ludford, G. S. S. D'Alembert's paradox and the moment formula in three-dimensional subsonic flow, 4656
Lüdi, F. Observations on the effect of plasma oscillations in transit time tubes, 1667
Luft, N. W. Asymmetric internal rotational barriers about single bonds, 3494. Loose transition states involving internal rotation, 5630
Lugéon, J. Sferics, 1278. Radiosounding of wind by impulses without responder, 8122
Lumbroso, H. Electric moments of mesomeric systems. Study of hydrocarbons with polar substituents and of heterocyclic compounds, 7022*
Lumbroso, N. and François, H. Magnetic anisotropy of several organic crystals at low temperatures, 7798
Lummis, F. L. *See* Humphrey, J. N., 4093
Lunbeck, R. J. *See* Michels, A., 2428, 6537
Lund, J. T. *See* Bair, E. J., 5765
Lund, L. H. Note on the free volume equation of state for hard spheres, 1422
Lundby, A. The use of scintillation detectors for measuring ultra-short time intervals, 4163. Delayed photoneutrons in a heavy-water reactor, 7139. *See also* Holt, N., 5710
Lundby, A., Scarsvåg, K. and Andersen, E. Slow neutron scintillation detector, 5539
Lundén, A. *See* Klemm, A., 1216
Lundgren, G. The crystal structure of $U(OH)_2SO_4$, 551 The crystal structure of $U_6O_4(OH)_4(SO_4)_6$, 5220
Lundquist, S. Stability of orbits in a strong-focusing synchrotron, 8456
Lunel, M. *See* Bigay, J. H., 7404
Lunn, B. *See* Arley, N., 4492
Lusby, W. S. *See* Cole, D. P., 924
Lüst, R. Line emission from interstellar matter in the radiofrequency range, 581. Magneto-hydrodynamic shock waves in a plasma of infinite conductivity, 8583
Lüty, F. Colour centres in fluorspar, 8777
Luzatti, V. Determination of a crystal structure when the positions of some of the atoms are known: statistical treatment, 2819. Crystal structure of $HNO_3.3H_2O$. I. Determination of the structure,

utilization of the Patterson function, 2831; II. Localization of the hydrogen atoms; discussion of errors; description of the structure, 2832. Statistical treatment of errors in the case of a pseudocentrosymmetric structure, 8083
Lyand, R. *See* Foex, M., 6951
Lynn, R. E., Jr. *See* Kobe, K. A., 6714
Lyon, W. S. Disintegration of Cr^{51}, 396. Neutron capture cross sections for production of Sc^{46} and Sr^{85}, 5080
Lyons, H. *See* Nuckolls, R. G., 3135
Lyons, L. E. Absorption by pyrimidines of plane polarized ultraviolet light, 760. *See also* Craig, D. P., 127
Lyons, W. J. Viscoelastic properties as functions of the distribution of activation energies, 3655
Lyttleton, R. A. On the origin of comet's tails, 6407. The comets and their origin, 7396
Lyubarskiĭ, G. Ya. and Pargamanik, L. É. Statistical theory of the magnetron (static conditions), 5543
Lyubimov, A. L. *See* Azimov, S. A., 8497
Lyubov, B. Ya. Determination of the coefficient of diffusion $D \pm D_0 + \alpha C$, 5726

Ma, S. T. Bound states and the interaction representation, 1380. Power-series expansion of the unitary operator $U(t, t_0)$, 6378
MacAdam, D. L. Dependence of color-mixture functions on choice of primaries, 5987. Truncated weighted ordinate integrations in colorimetry, 6684
MacAnuff, J. W. *See* George, E. P., 5557
MacAskill, D. *See* Johns, M. W., 2491
McBee, W. D. A study of the influence of a strong transverse magnetic field on an unconfined glow discharge in air at about 1 mm pressure, 4120
McCaig, M. The preferred direction in a magnetically hardened permanent magnet alloy, 4219
McCall, D. W. *See also* Gutowsky, H. S., 2617, 3699
McCall, D. W. and Gutowsky, H. S. Chlorine pure quadrupole resonances, 7040
McCarthy, J. A. Search for double beta-decay in Sn^{124} and Zr^{96}, 6207
McCarthy, K. A. *See* Ballard, S. S., 489
McClelland, C. L. *See also* Stewart, H. B., 7158
McClelland, C. L. and Goodman, C. Excitation of heavy nuclei by the electric field of low-energy protons, 8676
McClelland, J. D. *See* Eatherly, W. P., 2533
McClelland, J. D. and Donoghue, J. J. The effect of neutron bombardment upon the magnetic susceptibility of several pure oxides, 6956
McCloy, J. *See* Williamson, W. F., 6547
McClure, C. D. *See* Yost, W. J., 3762
McClure, D. S. *See* Schnepp, O., 7003
McClure, G. W. Specific primary ionization of H_2, He, Ne, and A by high energy electrons, 6116
McClure, R. E. *See* Gutowsky, H. S., 8633
MacColl, A. *See* Coulson, C. A., 4955; Green, J. H. S., 3676
McCombie, C. W. Fluctuation theory in physical measurements, 8199
McConnell, H. Effect of opposed disubstitution on intensities of even-even electronic transitions, 2597
McConnell, H., Ham, J. S. and Platt, J. R. Regularities in the spectra of molecular complexes, 2341
McConnell, J. Vacuum polarisation by spin one particles, 32. Note on the production of pseudoscalar mesons, 3615
McConnell, L. D. *See* Spooner, H., 6677
McCorkle, W. H. Heavy water in nuclear reactors, 7944
McCormick, W. W. *See* Wahr, J. C., 3096
McCourt, C. F. An instrument for the measurement of the density of aqueous ionic solutions, 7484
McCrary, C. L. *See* Allen, W. A., 3035
McCrea, W. H. Notes on the Lyttleton theory of comets, 6399. Cosmology, 8183. *See also* Hogarth, J. E., 1361
McCue, J. J. G. *See* Francis, A. E., 4363
McCulloch, R. K. *See* Haigh, C., 8435
McCulloh, K. E. and Glockler, G. The electronic emission spectrum of $C^{13}O^{16}$, 1507
McCullough, J. D. *See* Marsh, R. E., 8093
McCusker, C. B. A. *See also* Keefe, D., 275; Roesler, F. C., 7783, 7785
McCusker, C. B. A., Messel, H., Millar, D. D. a Porter, N. A. An experimental investigation of nucleon cascade in water, 4185
McCusker, C. B. A. and Millar, D. D. Lc penetrating showers from water and carbon, 943
McCusker, C. B. A., Porter, N. A. and Wilson, B. The production of mesons above 10 BeV, 6928
McDaniel, E. W. *See* Crane, H. R., 926
McDiarmid, I. B. The X-ray spectrum from a 70 M synchrotron, 1669. Angular separation of elect pairs, 4331. The energy spectrum of the X r from a 70-Mev. synchrotron, 6827
McDole, C. J. *See* Arthur, J. S., 1834; Hausm H. J., 1835
McDonal, F. J. A Fourier analyzer, 3792
MacDonald, A. *See* Lehovec, K., 5439, 8768
MacDonald, A. D. High frequency breakdown neon, 252
MacDonald, A. D. and Betts, D. D. High freque gas discharge breakdown in neon, 6814
McDonald, C. C. and Gunning, H. E. Isotope enr ment by the photoexcitation of specific isotopes, 2
MacDonald, D. E. Air photography, 6370
MacDonald, D. K. C. The minimum of electr resistance at low temperatures, 215. Self-diffus in the alkali metals, 3632. *See also* Corn F. H. J., 1571; Dugdale, J. S., 2405; Kelly, F. 1594
MacDonald, D. K. C. and Pearson, W. B. Resid resistance in dilute copper alloys, 217. Ther electricity at low temperatures. I. The "id metals: sodium, potassium, copper, 7690
McDonald, G. Flame propagation in carbon monox 185
MacDonald, J. C. F. *See* Chisholm, D. A., 754
McDonald, K. L. Diffraction of spherical vector wa by an infinite half-plane, 7610
McDonald, S. R. *See* Greenhill, E. B., 1415
McDonald, T. R. R. *See* Beevers, C. A., 553
McDowell, C. A. and Cox, B. G. The dissocia energy of the C–I bond in methyl iodide f electron impact measurements, 350
Macek, O. Filter spectroscopy, 3980
McEllistrem, M. T. *See* Donahue, D. J., 2 Jones, K. W., 7862
McEwan, A. C. and Tipper, C. F. H. Slow combus of cyclopropane, 502. The slow combustion cyclopropane. I. General kinetics, 3680
MacEwan, D. M. C. Randomly stacked layers in minerals, 5221
McEwan, W. S. *See* Burkardt, L. A., 6000
McFadden, J. A. Initial behavior of a spherical b 678. Summation of Fourier series, 3782
Macfadyen, K. A. *See* Goodwin, D. W., 3341*
McFarland, C. E. and Shull, F. B. Magnetic ana of the $Sr^{88}(d, p)Sr^{89}$ reaction, 2699
McFarland, R. H. and Hein, R. E. A cours radioactive determinations, 5052
McGarvey, B. R. *See* Gutowsky, H. S., 3699, 7 7795
McGee, C. G. and Iyengar, B. R. Y. Determinatio osmotic coefficients. I. Construction and calibra of the thermistor bridge, 2246
McGee, P. R., Cleveland, F. F., Meister, A. Decker, C. E. and Miller, S. I. Substit methanes. X. Infrared spectral data, assignm potential constants, and calculated thermodyn properties for CF_3Br and CF_3I, 2591
McGeer, P. L. and Duus, H. C. Effect of pressur the melting point of Teflon tetrafluoroethylene r 818
McGlashan, M. L. *See* Guggenheim, E. A., 4644
McGowan, F. K. *See* Klema, E. D., 7895
McGruer, J. N. *See* Worthington, H. R., 6096
McGuire, A. D. *See* Camac, M., 1020
McGuire, J. C. *See* Sidhu, S. S., 1262
McGuire, T. R. *See* Maxwell, L. R., 8541
McHale, J. L. *See* Freeman, B. E., 1903; Joh J. L., 7132
McHargue, C. J. The crystallography of the tita transformation, 8095
McHenry, J. J. and Twomey, S. Condensation n produced by ultraviolet light, 3775*
Machida, S. *See also* Taketani, M., 49

hida, S., Ônuma, S. and Taketani, M. On the fourth-order nuclear potential, 50
hida, S. and Tamura, T. On the Z-dependence of the positive-negative ratio of the mesons produced by photons on nuclei, 451
hlup, S. *See* Brown, W. L., 6272
ht, S. H. and Kutz, E. R. Detection of faulty roentgenoscopic technique by direct radiation measurements, 2867
inante, J. A. Electromagnetic vibration pick-ups with simple seismic suspension, 4662
ntosh, D. H. *See* Lewis, R. P. W., 564
ntosh, J. S., Gluckstern, R. L. and Sack, S. Proton triton interaction, 912
ntosh, R. *See* Amberg, C. H., 2794; Snelgrove, J. A., 5179–80
ntyre, J. A. *See* Hofstadter, R., 7722
k, C. The tension in strings wrapped slantwise round cylinders, 7475
k, R. C., Neuer, J. J. and Pool, M. L. Radioactive europium 150 and gadolinium 150, 7875
kay, A. L. Setting a single crystal by non-equatorial X-ray reflexions, 539. A statistical treatment of superlattice reflexions, 2820. Refractive index determination for anisotropic crystals, 6595. An X-ray camera for measuring preferred orientation in wires, 7305
Kay, K. G. *See* Johnson, J. B., 7724
kay, R. S. Sustained Foucault pendulums, 2920
ke, W. Two-particle potential from the Bethe-Salpeter equation, 7455
Keehan, M. and Warren, B. E. X-ray study of cold work in thoriated tungsten, 2770
Kellar, A. Review of stellar isotopic abundances, 6437. *See also* Barrow, R. F., 3992
Kellar, A. and Climenhaga, J. L. A comparison of observed and calculated intensity profiles for the C_2 Swan bands in cometary spectra, 6412
Kenzie, C. D. *See* Collins, E. R., 3589–90
cKenzie, D. R., Lounsbury, M. and Boyd, A. W. The β^- half-life of Pu^{241}, 5673
kenzie, H. A. E. and Malherbe, P. N. Studies on isotopes. II. The approach to isotopic equilibrium during fractional distillation with appreciable hold-up in the still-pot, 7055; III. The performance of stainless steel gauze ring packing in the isotopic fractionation of water, 7056
kenzie, H. A. E. and Milner, A. M. Studies on isotopes. I. The isotopic composition of water which has been enriched in heavy isotopes by fractionation, 7054; IV. Catalysis of isotopic exchange between gaseous oxygen and liquid water, 7057
cKenzie, K. R. *See* Howe, H. A., 4857
Kinley, D. W. R. Effect of radar sensitivity on meteor echo durations, 6389
Kinley, D. W. R. and Millman, P. M. Long duration echoes from aurora, meteors and ionospheric back-scatter, 2855
cklin, R. L. *See* Rohr, R. C., 919
cKnight, M. L. *See* Chasson, R. L., 3375
Laran, A. C. *See* Burbury, D. W. P., 1727
Lauchlan, T. A. *See* Sennett, R. S., 7972
Lean, D. Interaction between crystal slip and grain boundary movement, 8725
Lean, D. and Farmer, M. H. Measurement of force required to pull through a 1 in. diameter Wilson vacuum seal, 8275
Lellan, A. G. The stress tensor, surface tension and viscosity, 3897
Lennan, J. A., Jr and Havas, P. Conservation laws for fields of zero rest mass. I, 29
Lernon, F. *See* Bay, Z., 282
Leroy, E. G. *See* Lagemann, R. T., 5319
Loughlin, R. C. and Chiles, J. R., Jr. A field meter for sound velocity measurements, 5933
Mahon, C. *See* Eichholz, G. G., 5187
Mahon, H. O. *See* Šimon, I., 1519
Math, R. R. *See* Mohler, O. C., 3814
Mullan, D. An improved scanning electron microscope for opaque specimens, 4850. The scanning electron microscope and the electron-optical examination of surfaces, 5138
Mullen, C. C. *See also* Johns, M. W., 397
McMullen, C. C. and Johns, M. W. The decay of Re^{188} and the lifetimes of Os^{186m} and Os^{188m}, 7870
McNally, F. A. Film thickness measurement for grating blanks, 5981. *See also* Rice, D. K., 166
McNally, J. R., Jr. *See* Stukenbroeker, G. L., 1502
McNamara, F. L. and Beyer, R. T. A variation of the radiation pressure method of measuring sound absorption in liquids, 3068
McNamara, F. L. and Rogers, T. F. Direct viewing of an ultrasonic beam in a transparent solid, 3952
Macnee, A. R. A high speed product integrator, 3791
McNesby, J. R., Davis, T. W. and Gordon, A. S. The mechanism of acetone pyrolysis, 7264
McNicol, R. W. E. *See* Strohfeldt, M., 562
McPhillips, J. *See* Breyer, B., 8756
McQuillan, M. K. Behaviour of platinum/platinum-rhodium thermocouples at high temperatures, 813
McReynolds, A. W. Neutron monochromator crystals—Fe$_3$O$_4$ and Ge, 1156
Macris, C. The average life of facular granules, and luminous areas in the penumbra of sunspots, 586. Investigations of the photospheric granulation, 5278
McShane, W. J. *See* Woodruff, O. J., Jr, 7947
McSkimin, H. J. Measurement of elastic constants at low temperatures by means of ultrasonic waves—data for silicon and germanium single crystals, and for fused silica, 7989
McWeeny, R. The diamagnetic anisotropy of large aromatic systems. IV. The polyacenes, 326; V. Interpretation of the results, 6955. X-ray scattering by aggregates of bonded atoms. III. The bond scattering factor: simple methods of approximation in the general case, 8087
Maczuk, J. *See* Henkels, H. W., 7691
Madan, M. P. *See* Srivastava, B. N., 658, 3015, 3483, 5618, 6986
Madansky, L. *See* Battey, J., 1878; Bolgiano, P., 2665; Chagnon, P. R., 8707; Robinson, B. L., 1087
Madelung, O. *See also* Gremmelmaier, R., 8051
Madelung, O. and Welker, H. On the theory of mixed semiconductors, 6039
Mador, I. L. and Quinn, R. S. The influence of temperature and state on infrared absorption spectra: methyl iodide, 1510
Maebe, J. *See* Ruyssen, R., 8745
Maecker, H. Transition probabilities of several C I and C II lines measured in an alcohol stabilized arc, 6609
Maeda, S. On the mechanism of magnetic after-effect of a ferromagnetic substance, 4200
Maeder, D. and Wintersteiger, V. Quantitative evaluation of γ-ray spectra from scintillation measurements, 5037
Maehly, H. J. A new variation method for approximate computation of eigenvalues of Hermitian operators, 5267
Maekawa, S. *See* Arizumi, T., 1961
Maerker, R. E. and Birkhoff, R. D. Experimental K to $I + M$ ratios for internal conversion lines, 4328
Maesen, F. van der. *See* van der Maesen, F.
Magat, M. *See* Wall, L. A., 8025
Magee, J. L. *See* Samuel, A. H., 6298
Mager, A. The influence of grain size on coercive force, 1757
Maglić, B. Glass-to-metal seals making for laboratory purposes by a high-frequency method of heating, 4540
Magnac-Valette, D. *See* Cüer, P., 7924
Magnéli, A. A series of structurally interrelated molybdenum and molybdenum tungsten oxides Me$_n$O$_{3n-1}$, 2079. Structures of the ReO$_3$-type with recurrent dislocations of atoms: "homologous series" of molybdenum and tungsten oxides, 8060. *See also* Blomberg, B., 8104
Magnus, W. Infinite matrices associated with diffraction by an aperture, 8296
Magono, C. Design of an integrating thermometer, 2425. On the fall velocity of snowflakes, 5808
Mahan, A. I. and Templin, H. A. Third-order methods as applied to zonal aberrations of single long focal length lenses, 4689
Mahendroo, P. P. *See* Parthasarathy, S., 6558, 7528
Mahlman, H. A. *See* Reynolds, S. A., 7105

Mahmoud, H. M. and Konopinski, E. J. The evidence of the once-forbidden spectra for the law of β-decay, 1888
Mahrous, M. A. The development of a multi-flash camera and its application to the study of liquid jets, 1325
Maier, H. *See* Kortüm, G., 7540
Maier-Leibnitz, H. *See* Koester, L., 1872, 6089*
Maignan, P. Scattering and absorption of gamma-rays, 7101. *See also* Blanc, D., 1699; Detœuf, J. F., 1700
Maignan, P., Blanc, D. and Detœuf, J. F. Elementary theory of generating functions. Application to statistical fluctuations of scintillation counters, 5538
Maita, J. P. *See* Tanenbaum, M., 8410
Maitrot, M. *See* Mikumo, T., 6364
Major, J. V. A quick method of distortion measurement in nuclear emulsions, 298
Majorana, Q. New kinematical considerations on special relativity, 597. Space and time, 2163
Majumdar, K. *See also* Sur, P. K., 3121
Majumdar, K. and Sodha, M. S. On the resolving power of a prism, 5376
Majumdar, N. A note on the apparent disappearance of radiation in the theory of the expanding universe, 3850
Majumdar, R. C. and Mitra, A. N. The effect of damping on radiative corrections to electron scattering and the problem of infra-red catastrophe, 8222
Majumdar, S. K. On the determination of the lattice constants of some cubic crystals by electron diffraction, 8804
Makram, H. Contribution to the study of the diffusion of ions through metallic coatings. II. Effect of concentration, 3754. *See also* Bonnemay, M., 1215
Maksimov, B. I. *See* Belen'kiĭ, S. Z., 5553
Maksimov, I. V. On "polar tides" in the sea and the earth's atmosphere, 5286
Malaker, S. F. *See* Horowitz, M., 815
Malakhov, L. N. *See* Rȳvkin, S. M., 7677
Malan, D. J. The air discharges and the lower positive charge in a thundercloud, 5253
Malcolm, I. The effect of a finite nucleus on beta-decay, 1887
Malé, D. On the choice of measurements to be made for simultaneous determination of the optical constants and thickness of thin absorbing films, 3177
Malenka, B. J. *See* Kruse, U. E., 2703
Malet, L. Comparison of Kew Mk ii radiosondes by the method of twin elements, 2840
Malherbe, P. N. *See* Mackenzie, H. A. E., 7055–6
Malitson, I. H. *See* Stephens, R. E., 3090
Malkov, M. P. and Fradkov, A. B. Hydrogen liquefier for the Scientific Research Institute, 6011
Malleman, R. de. *See* de Mallemann, R.
Malling, L. Nuclear resonance spectrometer, 5658
Mallmann, C. A. Double beta coincidence spectrometer, 4855
Maloof, S. R. and Erard, H. R. A critical evaluation of the Norelco high angle X-ray spectrometer for elastic strain measurements, 1981
Malter, L. *See* Ramberg, E. G., 1705
Malvano, R. *See* Demichelis, F., 7110, 8663
Malvaux, P. Investigation of an intrinsic law for the composition of velocities, 1364
Malvicini, A. Scintillation detectors for α-particles, 1698. *See also* Bracci, A., 5035, 8662
Malý, K. *See* Řezníček, J., 976
Malyavkin, L. P. *See* Vaĭnshteĭn, L. A., 6054
Malyuzhinets, G. D. The "damping principle" and the problem of forced oscillations in an arbitrary domain, 83. A remark on the "radiation principle," 86
Man Quan Pham. *See* Pham Man Quan
Manaresi, E. *See* Puppi, G., 7908
Manchester, F. D. *See* Cwilong, B. M., 190
Mandel, J. The settlement of a bed of clay under a concentrated load, 1175
Mandelkern, L. *See* Fox, T. G., 3005
Mandeville, C. E. and Albrecht, H. O. The alpha-particle induced phosphorescence of silver-activated sodium chloride, 4036. The phosphorescence of thoria, 6657. The storage of energy in silver activated potassium chloride, 7591
Mandeville, C. E., Shapiro, E., Mendenhall, R. Zucker, E. R. and Conklin, G. L. Gamma-ra from Sn^{125}, 1082. Gamma-radiations from Z and Nb^{95}, 2657. Radiations from Zr^{97} and Nb 3549
Mandl, F. The ionization by electron impact of exciti hydrogen atoms, 4887
Mandl, F. and Skyrme, T. H. R. The theory of t double Compton effect, 2678. Energy dependen of neutron total cross sections, 7934
Mandl, M. E. A method of measuring the avera energy of a neutron spectrum in the range 0·3 3·0 MeV, 5116. Energy flux and average energy neutrons scattered by the walls of a laboratory, 51
Mandò, M., and Ronchi, L., Jr. On the energy ran relation for fast muons in rock, 1726
Manduchi, C. *See* Bassi, P., 1720, 7760, 7770, 8504
Manecke, G. Electrical conductivity of cation exchan membranes, 6288. Membrane accumulator, 6292
Manes, M. On the relaxation time of equilibri systems as related to ultrasonic absorption a reaction kinetics, 506
Manfredini, A. *See* Cortini, G., 7780
Manigault, P. Difficulties in the observation in ph contrast of microscopic preparations of living obje 3228
Mann, A. K. *See* Halpern, J., 1125, 1129, 1947
Mann, D. E. and Plyler, E. K. The ν_9 fundamental C_2F_6, 7000
Mann, H. B. Introduction to the theory of stochas processes depending on a continuous paramet 4556
Mann, H. M. *See* Darlington, L. E., 6231
Mann, K. C. *See* Pearce, R. M., 5048
Manneback, C. *See also* Charette, J., 4248
Manneback, C. and Lecomte, J. Remarks on totally symmetrical vibrational modes of pure a substituted ethylene, mainly of molecules of type $R_2C_2R_2$, 1001
Manneback, C. and Rahman, A. Potential funct for the out of the plane vibrations of C_2H_3Br a its seven deuterated substitutes and the effect t anharmonicity on the calculation, 5631
Manners, D. J. *See* Harrap, B. S., 519
Manning, L. A. *See also* Villard, O. G., Jr, 560
Manning, L. A., Villard, O. G., Jr and Peters A. M. The length of ionized meteor trails, 6390
Mansfield, R. The electrical conductivity and therr electric power of magnesium oxide, 8411
Mansfield, R. and Salam, S. A. Electrical propertie molybdenite, 6768
Manson, N. *See* Ferrié, F., 7619; Guénoche, H., 3
Many, A. *See also* Banbury, P. C., 6978
Many, A., Oppenheim, U. and Amitsur, S. An electr computer for the solution of linear simultane equations, 2899
Maple, E. *See* Singer, S. F., 2100
Mapleton, R. A. Elastic wave propagation in s media, 687. Diffraction patterns for solid d lines, 5347
Mapother, D. Effect of X-ray irradiation on the diffusion coefficient of Na in NaCl, 4406
Marache, J. Gaultier du. *See* du Marache Gaultier.
Marais, A. *See* Darmois, E., 6747
March, A. Quantum mechanics of particles and w fields, 602
March, N. H. The virial theorem in the Thom Fermi theory, 1439. Thomas–Fermi fields for m cules with tetrahedral and octahedral symme 1803. The virial theorem in free electron generalized Thomas–Fermi models, 4939
Marchetti, C. *See* Cerrai, E., 1854–5
Marchetti, L. Determination of the velocity field plane subsonic flow, 4655
Marchington, B. *See* Kitz, N., 8088
Marck, P. and Taurel, L. Molecular interpreta of the strain-optical constants of sodium chlor 5427
Marcus, B. *See* Leistner, K., 1566
Marcus, J. A. *See* Logan, J. K., 1793
Marcus, P. M. The free energies and phase transi of a cylindrical superconductor, 242
Maréchal, A. The control of grating quality by p contrast, 3220

RÉCHAL, M. The automatic control of exposure time of radiographs by using photoelectric cells, 6350
RGEM, N. *See* ARAGÃO, M. B., 2106
RGENAU, H. *See also* BLOOM, S., 5951; EVETT, A. A., 6160
RGENAU, H. and ROSEN, P. On the interaction of closed shells, 3489
RGOLIS, B. Neutron capture cross sections, 457
RGRAVE, J. L. *See* GILLES, P. W., 3491
RGUIN, G. Treatment of nuclear emulsions from 100 to 1000 μ thick, 6368
RIÉE, M. *See* BOULLÉ, A., 5208
RIENS, P. *See* VAN ITTERBEEK, A., 8270
RIKYAN, G. A. Existence of high energy deuterons in cosmic rays, 7758
RIN, P., BISHOP, G. R. and HALBAN, H. The absolute standardization of the 2·615 MeV γ-rays of ThC″ and the cross section for the photodisintegration of the deuteron at this energy, 7140
RINER, T. *See* STAMM, R. F., 2326
RININ, V. A. On the question of the time of relaxation of the electrical double refraction of liquids, 3194
RION, J. B. *See* DAVIS, K. E., 310
RION, T. M. *See* FOX, F. E., 5914
RK, H. *See* OSTER, G., 4448
RKEVICH, A. M. *See* KARPENKO, A. S., 5471; RYABININ, YU. N., 5406
RKHAM, J. J. Speculation on the formation of *F*-centers during irradiation, 1250. Imperfections in nearly perfect crystals, 2810. Second-order acoustic fields: relations between energy and intensity, 3048. *See also* DUERIG, W. H., 1251
RKHAM, M. C. *See* LAIDLER, K. J., 7235
RKHEIM, L. S. *See* BLOMGREN, R. A., 4298
RKIN, B. I. Electrical conductivity of boron-thallium glasses, 857. Electrical conductivity of alkaline boro-silicate glasses, 1639
RKON, L. O. *See* GEGUZIN, YA. E., 7967
RKOVITZ, H. A property of Bessel functions and its application to the theory of two rheometers, 495
RKSTEIN, G. H. and SOMERS, L. M. A slot burner method for studying combustion wave instability, 6720
RKUVITZ, N. Diffraction by an aperture in a planar creen, 7802
RKWOOD, W. H., JR and SPURLIN, H. M. Residual stresses and strains in molded plastics, 3650
RMIER, P. *See* BOEHM, F., 7129
RMO, F. *See* WATANABE, K., 5236
RQUEZ, L. Spallation of Cu with high energy neutrons, 461. The beta-spectrum of Mg^{28}, 5022
RR, G. V. *See* DITCHBURN, R. W., 6644, 8325
RRE, P. H. DE LA. *See* DE LA MARRE, P. H.
RRIOTT, J. *See* WARREN, J. W., 4176
RSH, C. Some photographic methods applied to photometry, 2308
RSH, R. E., PAULING, L. and MCCULLOUGH, J. D. The crystal structure of β selenium, 8093
RSH, R. E. and SHOEMAKER, D. P. The crystal structure of NaPb, 2823
RSHAK, R. *See* VAN HOVE, L., 1934
RSHAK, R. E. The *S* wave in pion-nucleon scattering, 1933. *See also* MESSIAH, A. M. L., 1021
RSHALL, G. *See* BATES, L. F., 8573
RSHALL, I. and THOMPSON, A. B. Drawing synthetic fibres, 1948
ARSHALL, J. *See also* ANDERSON, H. L., 1685
ARSHALL, J., MARSHALL, L. and NEDZEL, A. V. Total cross sections of 408-MeV protons for hydrogen and light elements, 8677
ARSHALL, J., MARSHALL, L., NEDZEL, V. A. and WARSHAW, S. D. π^0 production cross section for 430-MeV protons on H and Be, 1147
ARSHALL, J. F. The theory of secondary emission, 267
ARSHALL, J. H. A liquid argon ionization chamber measurement of the shape of the beta-ray spectrum of K^{40}, 7886
ARSHALL, J. S. Precipitation echoes, 1287. Frontal precipitation and lightning observed by radar, 2848
ARSHALL, J. S., EAST, T. W. R., GUNN, K. L. S. and HITSCHFELD, W. The effect of particle shape and composition on microwave attenuation and scattering by precipitation, 2571
ARSHALL, L. *See* MARSHALL, J., 1147, 8677
MARSHALL, P. R. Determination of the pore-size distribution in porous metal bodies, 1173
MARSHALL, R. and DAVIDSON, N. Photoelectric observation of the rate of recombination of iodine atoms, 5613
MARSHALL, T. A. An apparatus for measuring the coefficient of thermal conductivity of solids and liquids, 4756
MARSHAM, T. N. *See* HOLT, J. R., 1113, 3591–3, 7126–7
MARTERSTOCK, J. *See* FRÜHLING, H.-G., 8302
MARTIENSSEN, W. Photochemical processes in alkali halide crystals at low temperatures, 5170
MARTIENSSEN, W. and PICK, H. Quantitative investigations on the X-ray coloration of sensitized KBr crystals, 6651
MARTIENSSEN, W. and POHL, R. W. On photochemical sensitization, 2019
MARTIN, A. and VERLET, L. Proton-proton scattering at intermediate energies, 3368
MARTIN, A. B. *See* JOHNSON, R. D., 1171
MARTIN, B. and TER HAAR, D. Statistics of the three-dimensional ferromagnet. I. The variational method, 2534
MARTIN, C. Analysis of α-emission in the region of rare earths, 1062. On the theory of the subtractive field and the mass spectrum of mesonic particles, 2200
MARTIN, C. E., JR. *See* THURSTON, G. B., 2277
MARTIN, D. G. E. and PARRY, G. Electromagnetic radiation from radium E, 4325. Some notes on collimated Compton spectra, 4329
MARTIN, D. H. *See* BATES, L. F., 3440
MARTIN, D. L. and GEISLER, A. H. Permanent magnet properties of cobalt-platinum alloys, 4918
MARTIN, D. S., JR. *See* JENSEN, E. N., 4999; MILLER, D. M., 5076
MARTIN, D. W. Thoughts on the imitation of natural sounds, 2288. *See also* CORK, J. M., 4304, 4995, 5000
MARTIN, H. *See* HARRAND, M., 3165
MARTIN, H. C. and TASCHEK, R. F. The (n, γ) and $(n, 2n)$ reactions in iodine, 5078
MARTIN, L. C. and RAMSAY, J. V. Experimental investigation of the structure of transparent glass surfaces using phase-contrast illumination, 3216
MARTIN, L. H. *See* CARO, D. E., 8288
MARTIN, P. *See* JAFFRAY, J., 6713
MARTIN, P. C. *See* DESER, S., 5861; KARPLUS, R., 5860
MARTIN, R. *See* ANDERSON, H. L., 7176
MARTIN, R. L. *See* GREENWOOD, N. N., 2242
MARTIN, W. M. and BRECKON, S. W. The new radioactive isotopes vanadium 46, manganese 50, cobalt 54, 7068
MARTINDALE, R. G. and LANGFORD, D. A. The preparation in sheet form of large single crystals of silicon-iron of predetermined orientation for magnetic purposes, 6306
MARTINET, J. Physical processes in semiconducting complexes, 843
MARTINI, J. E. P. *See* DE WAARD, H., 3152
MARTINOT-LAGARDE, A. and FAUQUET, A. The IMFL anemoclinometer—an instrument for the investigation of a fluctuating velocity vector, 1437
MARTIUS, U. M. *See* DIJKSTRA, L. J., 8604
MARTON, L., SIMPSON, J. A. and SUDDETH, J. A. Electron beam interferometer, 5515
MARTY, C., NATAF, R. and PRENTKI, J. On the spin of certain odd-odd nuclei. I. General formulae, 7838
MARTY, C. and PRENTKI, J. On the spin of some odd-odd nuclei, 1025
MARTY, N. The photoelectric absorption of γ-rays in the *L* shell of atoms, 1095
MARTY, N., LANGEVIN, H. and HUBERT, P. A study of the radiations emitted by $^{126}_{53}I$, 4989
MARTYN, D. F. Geo-morphology of *F*2-region ionospheric storms, 2098. The morphology of the ionospheric variations associated with magnetic disturbance. I. Variations at moderately low latitudes, 7350. *See also* BAKER, W. G., 2099
MARUHN, K. Existence consideration on the motion of vortex rings, 5885
MARVIN, R. S. *See* LEADERMAN, H., 7206
MARX, G. Relativistic electrodynamics of magnets, 2554. On the dilatational oscillations of nuclei, 6168. The interaction of elementary particles and the conservation laws, 6470. Dilatation oscillations of nuclei, 7026

Marx, J. Amplitude pulsations in the vibrational strain pattern of metal single crystals, 1979

Marx, J. W., Cooper, H. G. and Henderson, J. W. Radiation damage and recovery in Cu, Ag, Au, Ni, and Ta, 216

Marx, J. W. and Davis, B. I. Film boiling termination mechanism, 793

Marx, J. W. and Sivertsen, J. M. Temperature dependence of the elastic moduli and internal friction of silica and glass, 2765

Marzetta, L. A. *See* Gilford, S. R., 8821

Marziani, M. On the propagation of the wavefront in dispersive media, 2569. On the propagation of the wavefront in heterogeneous dispersive media, 2570

Masani, A. Contribution to the study of stellar atmospheres. I. The adiabatic gradient, 7407

Masket, A. V. Elementary theory of neutron sources in reactors, 3609. *See also* Brown, F. B., Jr, 1734

Maslakovets, Yu. P. *See* Devyatkova, E. D., 5467

Maslov, P. G. Vibration spectra of dimethylacetylene, 1007. Action coefficients and vibration spectra of methylacetylene and of methylhaloidacetylenes, 1008. *See also* Antipina, S. A., 1006

Mason, B. J. A discussion on theory of liquids: The spontaneous nucleation of supercooled water, 2243. Production of rain and drizzle by coalescence in stratiform clouds, 4504

Mason, B. J. and Owston, P. G. Ice crystals of spiral form grown from the vapour, 531

Mason, E. A. *See* Amdur, I., 349

Mason, V. V. and Kurtz, M. Rapid measurement of the thermal resistivity of soil, 1570

Mason, W. P. Properties of a tetragonal antiferroelectric crystal, 1237. Rotational relaxation in nickel at high frequencies, 8601

Mason, W. P., Hewitt, W. H. and Wick, R. F. Hall effect modulators and "gyrators" employing magnetic field independent orientations in germanium, 3470

Mason, W. P. and Matthias, B. T. The piezoelectric, dielectric, and elastic properties of $ND_4D_2PO_4$ (deuterated ADP), 1236

Masse, J.-L. Study of a fundamental ion in the series of oxazines, 364

Massey, H. S. W. Recombination of gaseous ions, 293. *See also* Abdelnabi, I., 3391; Bates, D. R., 4177

Massey, H. S. W. and Mohr, C. B. O. Strong coupling in inelastic collisions of electrons with atoms, 383

Massey, H. S. W. and Moiseiwitsch, B. L. Calculation of the 1*s*-2*s* electron excitation cross section of hydrogen by a variational method, 5664

Massey, J. T. *See* Jen, C. K., 3133

Mast, C. B. *See* Ziomek, J. S., 5625

Masters, J. I. An aerosol analyzer, 8744

Masuda, H. A new proof of Lagrange's theorem in hydrodynamics, 5880

Masuda, Y. *See also* Itoh, J., 6139

Masuda, Y. and Kanda, T. Chemical shift of the N^{14} magnetic resonance, 8565

Masumoto, H. and Kobayashi, T. On the abnormality in the thermal expansion of iron-platinum alloys, 4054

Mataré, H. F. Interaction of barrier layers and statistical fluctuations in the three-electrode crystal [transistor], 853

Matarrese, L. M. *See* Stout, J. W., 8546

Mateosian, E. der. *See* der Mateosian, E.

Mather, K. B. Proton-deuteron scattering at 5·1 MeV and deuteron-proton scattering at 10·2 MeV, 1690

Matheson, M. S. *See* Grossweiner, L. I., 146; Hennig, G., 4450

Mathews, P. M. *See* Ramakrishnan, A., 8181

Mathieu, J.-P. *See* Couture-Mathieu, L., 4733, 6662; Drouard, E., 7810

Mathieu, R. and Demers, P. Energy loss of highly charged particles produced by fission and by cosmic rays. II. Photometric measurements on fission fragments, 1928

Mathieu-Sicaud, A. *See* Chaume, G., 8830

Mathot, V. *See also* Prigogine, I., 3916–17

Mathot, V. and Desmyter, A. Application of the cell method to the statistical thermodynamics of solutions. II. Experimental, 5448

Matitsch, T. *See* Schneider, W., 4975

Matossi, F. A modified Silberstein model of opti anisotropy, 1820. A classical model of molecu dipoles and polarizabilities, 3515. The influence an electric field on a continuously excited phosph 8330

Matossi, F. and Nudelman, S. Influence of electric fie on luminescence, 3176

Matsen, F. A. The united atom treatment of H_2^+, 56 *See also* Brown, R. D., 7826

Matskevich, T. L. *See* Eremeev, M. A., 6103

Matsubara, T. The quantum mechanics of assemb of interacting particles, 202

Matsuda, H. The asymptotic expression for the str ture function of interacting particles, 3932. *See a* Ogata, K., 1857, 3536

Matsuda, K. *See* Hisatake, K., 6538; Sakata, 6190

Matsuda, S. On the superlattice formation in tern alloys, 2080

Matsumoto, M. *See* Kondo, S.-I., 8775

Matsumoto, T. Theory of electromagnetic shielding a shielding room of wire-netting, 4227

Matsuyama, S. and Miyazawa, H. An interpretat of the meso-disintegration of the deuteron in te of the strong coupling meson theory, 4340

Matsuzaki, Y. *See also* Ogawa, S., 4485

Matsuzaki, Y. and Sasaki, M. The capture proc of π mesons by deuterons, 3619

Mattauch, J. Precision mass spectrographs (a c parison of existing apparatus), 6093

Mattauch, J. and Waldmann, L. Method of de mining mass spectroscope dispersion, 6864

Matthews, J. C. *See* Hoare, F. E., 956, 4064

Matthews, P. T. *See* Salam, A., 4615

Matthias, B. T. Superconducting compounds of n superconducting elements, 5482. Superconduct compounds, 7686. *See also* Mason, W. P., 123

Matthias, B. T. and Hulm, J. K. Superconduct properties of cobalt disilicide, 2467

Mattiat, O. Transducers for producing ultraso waves, 3055

Mattig, W. The radial distribution of magnetic fi strength in normal sunspots, 5837

Mattson, R. H. and van der Ziel, A. Shot noise germanium filaments, 4099

Matukura, Y. *See also* Matumura, O., 69; Numa T., 228

Matukura, Y. and Okazaki, A. The contact poten difference of selenium rectifiers, 852

Matumura, O. On the infra-red absorption bands water of crystallization, 125

Matumura, O., Okazaki, A. and Matukura, Y. optical properties of solutions of mixed salts, 69

Matuyama, E., Crystal distortion of graphite in irons, 2050

Maue, A.-W. *See* Hönl, H., 331

Maurer, E. A new theoretical and experimental v fication of Meissner's entropy principle in hyd namics in the case of Couette flow, 5883

Maurer, R. *See* Dutton, D., 4478

Mausteller, J. W. *See* Simons, J. H., 71

Mawardi, O. K. and Dyer, I. On noise of ae dynamic origin, 5361

Maximon, L. *See* Bethe, H. A., 7903

Maxwell, D. E. *See* Hahn., E. L., 1014

Maxwell, E. Similarity properties of the two-fl model of superconductivity, 238

Maxwell, L. R. and McGuire, T. R. Antife magnetic resonance, 8541

May, A. Vertical entry of missiles into water, 647

May, C. E. *See* Edgell, W. F., 755

May, H. A. See Berlman, I. B., 6361

May, J. *See* Freedman, M. S., 1881

May, J. E. and Foster, B. P. Gamma-rays from M 4324

May, M. M. *See* Fretter, W. B., 1944

May, S., Fava, A. and Giraudel, B. Kinetics of isotopic exchange reactions between the ion I differential aliphatic, alicyclic, and aromatic iodi 3677

Mayants, L. S. Exclusion of dependent coordinate the theory of vibrations of multi-atomic molecu 8616

AUTHOR INDEX

aud, P.-N. The mean geomagnetic field and its secular variation in Adélie Land at 1st January, 1952, 5793
burg, S. and Rotondi, L. Thermal acceptors in vacuum heat-treated germanium, 8409
bury, P. C. and Koski, W. S. Kinetics of two exchange reactions involving diborane, 4444
ence, J. Absorption spectra at low temperature. Study of N_2O gas, NO gas and liquid, 740
er, G. On the modulation of electrical resistance of germanium by a standing acoustic wave of high frequency, 8408
er, L. Electron optical image of an electron beam, 2484
er, M. G. The origin of the elements, 6437
er, R. *See* Larson, E. V., 1590
er, S. W. and Trueblood, K. N. Three-dimensional Fourier summations on a high speed digital computer, 8789
er-Kuckuk, T. *See* Koester, L., 1872
field, E. B. *See* Allen, W. A., 3095
ne, K. I. *See* Paneth, F. A., 8510
neord, W. V. The radiography of the human body with radioactive isotopes, 4539
neord, W. V. and Newbery, S. P. An automatic method of studying the distribution of activity in a source of ionizing radiation, 4538
ot, M. Tables of functions involved in the calculation of corrections for diffusion in photometry of the night-sky light, 5250
per, V., Jr and Herlin, M. A. Second-sound velocity below 1°K as a function of pressure, 3259
s, J. M. and Dailey, B. P. Microwave spectra and structures of XYH_3 molecules, 742
ze, R. *See* Kessler, D., 2528
zenko, J. J. *See* Schwertz, F. A., 8415
zur, P. On the states of minimum entropy production in continuous systems, 823. *See also* de Groot, S. R., 1651, 8386; Overbeek, J. T. G., 4643; Prigogine, I., 6738
hedlov-Petrosyan, O. P. *See* Landiya, N. A., 6282
de, J. E. *See* Hastings, A. E., 5
dows, J. W. High energy nuclear reactions and the Goldberger model, 436. Excitation functions for proton-induced reactions with copper, 7918
kins, R. J. *See* Dryden, J. S., 3294; Hamon, B. V., 1615
hlin, G. F. *See* Haltman, E. K., 2753
ke, R. Infrared spectroscopy and the character of chemical binding, 1511
icus, G. L. A ball of fire discharge with a pronounced current saturation, 3333
icus, H. A. *See* Easterday, H. T., 2660
ina, F. M. *See* Lozano, J. M., 609, 4607
ley, J. A. Frictional electrification of polar polymers, 6749
ved, D. B. The optical properties of natural and synthetic hackmanite, 7548
win, H. and Rudnick, I. Surface and volume sources of vorticity in acoustic fields, 5345
chan, C. J. *See* Dixon, C. E., 8452
k, J. M. and Turnock, R. C. Electro-optical shutters as applied to the study of electrical discharges, 2133
gaw, H. D. The construction of ball-and-spoke models of crystal structures, 5201. Origin of ferroelectricity in barium titanate and other perovskite-type crystals, 6757
gers, W. F. A description of the arc and spark spectra of rhenium, 3103
gill, L. R. *See* Emigh, C. R., 4132
il, C. R. and Havas, P. The classical scattering of neutral mesons, 8698
, J. Y. Size distribution of cosmic ray stars in photographic emulsions, 6914
, J. Y. and Pickup, E. Slow π-mesons in cosmic-ray stars and the negative-positive π-meson ratio, 6922
ckle, R. W. *See* Opler, A., 6682
er, R. Investigations in the region of tenth-millimeter waves, 8320
er, R., Ricamo, R., Scherrer, P. and Zünti, W. Total cross-sections of the elements N, Na, Al and Si for 1·9–3·8 MeV neutrons, 8704
er, R. and Schuster, K. Theory of wave propagation in piezo-electric crystals, 4792
Meighem, J. van. *See* van Meighem, J.
Meijer, H. J. G. and Polder, D. Note on polar scattering of conduction electrons in regular crystals, 6766
Meijer, P. H. E. The sextet ground-level in diluted iron-alum. II, 3430
Meijering, J. L. *See* Fast, J. D., 5123
Meiklejohn, W. H. Experimental study of the coercive force of fine particles, 8543
Meĭklyar, P. V. The form of the iso-opacity of a photographic layer, 4543
Meinke, W. W. Half-life of Pd^{109} and neutron activation cross section of Pd^{102}, 5005. *See also* Schott, G. L., 4303
Meinnel, J. Note on the relations between phase transitions, lattice defects, and Debye phenomena in solids, 8774
Meissner, H. *See* Meissner, W., 1646, 6794
Meissner, H. P. and Byrne, J. Bonding of thin films, 496
Meissner, K. W. *See* Davis, D. O., 5948; Deverall, G. V., 6611, 7609
Meissner, W., Schmeissner, F. and Meissner, H. Measurements in the transition region to superconductivity. III, 1646. Temperature, current, magnetic field phase diagram of superconductivity, 6794
Meister, A. G. *See also* El-Sabban, M. Z., 753; Ferigle, S. M., 354, 1525; McGee, P. R., 2591; Pontarelli, D. A., 1804; Weber, A., 5635; Ziomek, J. S., 2340
Meister, A. G. and Voelz, F. L. Substituted methanes. XI. Potential constants for CBr_3Cl, 1805
Meister, G. and Heine, T. H. Low pressure mercury discharges. III, 3339
Meitner, L. The application of the recoil in nuclear processes, 1861
Meixner, J. On the theory of thermal transfer in reacting fluid mixtures, 794. On the theory of the thermal conductivity of gases, 3230
Melchior, P. J. Long-period fluctuations of the velocity of rotation of the earth and the characteristics of the Chandlerian movement of the pole, 4578
Melkanoff, M. A. *See* Harris, E. G., 4965
Mellor, G. P. *See* Kruse, H. W., 7721
Melnikova, N. T., Shchukin, E. D. and Umanskiĭ, M. M. On the structure of layers of magnesium, zinc and cadmium, produced by the condensation of molecular beams, 2078
Melville, H. W. Size and shape of macromolecules, 7024
Melvin, H. M. A method of calculating the critical dimensions of spherically symmetrical reactors. I, 5094; II. Systems with a finite tamper, 5095
Melvin, M. A. The new classical electrodynamics, 7647
Memmert, G. The scattering of fast neutrons by complex nuclei, 5113
Mencher, A. *See* Finkelstein, R., 3502
Mendakov, N. S. *See* Shalimova, K. V., 1540
Mendelssohn, K. *See also* Brewer, D. F., 4060, 8368, 8370; Chandrasekhar, B. S., 6727
Mendelssohn, K. and Renton, C. A. Heat conductivities of superconductive Sn, In, Tl, Ta, Cb and Al below 1°K, 7688
Mendelssohn, K. and Rosenberg, H. M. The thermal conductivity of metals in high magnetic fields at low temperatures, 6698
Mendenhall, R. I. *See* Mandeville, C. E., 1082, 2657, 3549
Mendousse, J. S. Nonlinear dissipative distortion of progressive sound waves at moderate amplitudes, 2262
Menius, A. C. *See* Murray, R. L., 7156
Menter, J. W. Direct examination of solid surfaces using a commercial electron microscope in reflection, 3638
Menzel, D. *See* Kollath, R., 6743
Menzel, E. Measurement of thickness of microscopic objects using three-beam interference, 779
Menzel, E. and Kleinn, W. The resolving power for the combination of photographic plate and objective, 4683
Menzel-Kopp, C. The crossing of two extinction lines in electron interference with convergent beams, 3354
Menzies, A. C. Raman effect in solids, 8336

Meos, J. *See* Hellgren, G., 4519

Mercer, D. M. A. The physics of the organ flue pipe, 4661

Mercier, A. *See* Wilker, P., 7423

Mercier, R. Contribution to the study of surface and interfacial waves, 8255

Mériel, P. Dispersion of oscillation frequencies which form the thermal agitation of atoms in sodium chloride, 8055

Mering, J. *See also* Longuet-Escard, J., 7281

Mering, J. and Longuet-Escard, J. On the principles of the direct determination of the parameters of crystalline organization, 5210

Merlin, M. *See also* Bonetti, A., 8506; Ceccarelli, M., 1145, 2734

Merlin, M., Vitale, B. and Goldschmidt-Clermont, Y. Measurement of positive excess at low energy by means of a nuclear plate sandwich in a magnetic field, 1714

Merriam, C. N., Jr, Southworth, R. W. and Thomas H. C. Ion exchange mechanism and isotherms from deep bed performance, 2000

Merridew, J. N. and Raymond, W. F. Laboratory drying of herbage by radio-frequency dielectric heating, 3706

Merrifield, R. E. *See* Lord, R. C., 2798

Merrison, A. W. *See also* Goulding, F. S., 7192

Merrison, A. W. and Wiblin, E. R. The total neutron cross-section of cobalt, silver, iodine, aluminium, nickel and gallium between 1 eV and 5 keV, 1919

Merritt, W. F. *See* Bartholomew, R. M., 5086, 5091; Hawkings, R. C., 3539

Mertens, R. On the multiple scattering of charged particles, 6475–6

Merz, W. J. Domain properties in $BaTiO_3$, 208. Double hysteresis loop of $BaTiO_3$ at the Curie point, 7654

Merzbacher, E. *See* Lewis, H. W., 7920

Meshkov, S. Theory of complex spectra, 7844

Mesnard, G. Thermionic properties of thoria, 4888. Contribution to the study of thoria cathodes, 4889. On thoria cathodes, 5545. Some measurements relative to the filament of directly heated thoria cathodes, 7751

Messel, H. *See also* Green, H. S., 304, 1735; McCusker, C. B. A., 4185

Messel, H. and Green, H. S. A suggested scheme for meson production, 2739

Messel, H. and Potts, R. B. Note on the fluctuation problem in cascade theory, 307. Plural theories for the shower component in high energy nuclear disintegrations, 944. Longitudinal development of extensive air showers, 8493

Messiah, A. M. L. The very long lifetime of C^{14} β-decay, 411

Messiah, A. M. L. and Marshak, R. E. X-rays from the π-mesic atom, 1021

Messner, D. *See* Frohnmeyer, G., 7668

Metropolis, N., Rosenbluth, A. W., Rosenbluth, M. N., Teller, A. H. and Teller, E. Equation of state calculations by fast computing machines, 6026

Mette, H. and Pick, H. Electronic conductivity of anthracene single crystals, 6770

Metz, A. The Lorentz transformations not forming, in general, a "group." Physical significance of this property, 7418

Metzger, F. R. Disintegration scheme of Fe^{59}, 1870. Spin and parity of the 2·3-MeV excited state of Te^{124}, 5656. *See also* Schiff, D., 6213

Metzger, F. R. and Amacher, H. C. Internal conversion of the Sr^{88} gamma-rays, 423

Metzger, G. Positive temperature coefficient of the surface tension of molten metallic mixtures, 5889

Mévergnies, M. Nève de. *See* de Mévergnies, M. Nève

Meyer, A. J. P. Spectroscopic *g* factors of ferromagnetic nickel-copper alloys, 2540

Meyer, A. J. P. and Taglang, P. Simple h.f. furnace technique for fusing alloys from volatile components, 1322. Influence of magnetic field on polymorphic transformations in ferromagnetic substances, 5605

Meyer, B. Investigation of a flash tube for illuminating a Wilson chamber, 6690

Meyer, E. and Schodder, G. R. On the influence returning sound on the direction localization a intensity of speech, 5936

Meyer, H. I. Pore distribution in porous media, 572

Meyer, I. *See* Erdmann, K., 8829

Meyer, K. and Brune, W. Contributions on col development. V. On the behaviour of col developers towards silver salts without binders, 22

Meyer, L. *See* Long, E., 5440, 8369

Meyer, L. H. *See* Gutowsky, H. S., 3699, 8633

Meyer, M. F. Is listening to a telephone a psycho gically normal way of hearing? 5261

Meyer, P. and Schlieder, S. Investigation of excited states of titanium 48 with the aid of γ angular correlations, 8668

Meyer, R. *See* Pakswer, S., 6872

Meyer-Berkhout, U. *See* Krüger, H., 6180

Meyer-Eppler, W. *See* Krebs, H., 8074

Meyer-Schützmeister, L. *See also* Houtermans, F. 4973

Meyer-Schützmeister, L. and Vincent, D. H. Absol calibrations of low-energy β-emitters with the counter, 4974

Meyerhof, G. G. and Chaplin, T. K. The compress and bearing capacity of cohesive layers, 3661

Meyerhoff, G. The effect of inhomogeneity on relation between viscosity and molecular weight polymer solutions, 6302

Mezzetti, L. *See* Amaldi, E., 8495

Michael, D. H. Stability of plane parallel flows electrically conducting fluids, 3903

Michaelis, M. *See* Bryant, J., 2639

Michaelis, R. P. and Violet, C. E. The ratio of plat to minimum grain density for electrons, 7370

Michalowicz, A. On the internal bremsstrahlung Fe^{55}, 5692

Michalowicz, A. and Lederer, M. On the presence Co and Mn in Fe^{55} produced in the pile, 5709

Michard, R. New photometric observations of sunsp 585. Physical conditions in large sunspots dedu from their spectrum, 2149. Physical conditions sunspots deduced from their spectrum, 2910

Michel, L. Selection rules imposed by charge c jugation, 8215. *See also* Bonnevay, G., 4601

Michell, D. *See* Clarebrough, L. M., 2767

Michels, A. and Botzen, A. A method for the de mination of the thermal conductivity of gases high pressures, 2402

Michels, A., Lunbeck, R. J. and Wolkers, G. Thermodynamic properties of carbon monoxide temperatures between 0 and 150°c and at press up to 3000 atmospheres, 2428

Michels, A. and Strijland, J. The specific heat constant volume of compressed carbon dioxide, 2

Michels, A., Wassenaar, T., De Graaff, W, Prins, C. Vapour pressure of liquid nitrogen, 6

Michels, A., Wassenaar, T., Louwerse, P., Lunb R. J. and Wolkers, G. J. Isotherms and ther dynamical functions of propene at temperatu between 25° and 150°c and at densities up 340 Amagat (pressures up to 2800 Atm), 6537

Michels, A., Wassenaar, T. and Zwietering, T. A method for the measurement of the ther expansion of solids between 0 and −180°c, 6708

Michels, W. C. and Wiener, E. An undergradu experiment for the determination of alpha-part range, 4309

Michurin, V. K. and Chernov, L. A. Scattering sound in dispersion systems, 1465

Miczaika, G. R. *See* Bahner, K., 5833, 5842

Middleton, A. E. and Cochran, K. E. Semiconduct 828

Middleton, D. Statistical criteria for the detectio pulsed carriers in noise. I–II, 3794

Middleton, E. E. K. *See* Sanders, C. L., 2362

Middleton, R. *See also* Evans, W. H., 3587

Middleton, R., El-Bedewi, F. A. and Tai, C. T. investigation of the neutron groups from reactions $^{12}C(d, n)^{13}N$, $^{16}O(d, n)^{17}F$ and $^{32}S(d, n)^{3}$ 3586

Middleton, W. E. K. and Mungall, A. G. Co metry of bronze paints, 1564

Miduno, Z. and Hukuda, K. On a F-M type aco interferometer, 1451. On a substitution acoustic interferometer, 1452

GHEM, J. VAN. *See* VAN MIEGHEM, J.

LENZ, K.-D. and SCHÖNHEIT, E. On the theory of the quartz fibre manometer, 6509

SCHER, E. A study of the band spectra of N_2^+, NO and NO^+ in the Schumann region using N^{15}, 6413. *See also* BAER, P., 4705; BARROW, R. F., 3992

ESSNER, G. Colour centres in mixed alkali halide crystals, 8776

ESSNER, G. and PICK, H. The position of the *V*-bands in mixed alkali halide crystals, 8778

FSUD, J. F. *See* NOLLE, A. W., 2263

GEOTTE, M. *See also* VIGROUX, E., 6617

GEOTTE, M., NEVEN, L. and VIGROUX, E. Fine structure of the absorption bands of ozone at $9 \cdot 6\ \mu$ observed in solar and laboratory spectra, 4568

GNOLET, J. C. P. Simple and multiple gas micro-introductors for adsorption studies, 3696

HELICH, J. W. The probability of internal conversion of *K*-series radiation of Au arising from the interaction of the *L* sub-shells, 426. *See also* HILL, R. D., 414, 2669

HELICH, J. W. and DE-SHALIT, A. The decay of Au^{197m}, 7080

KAÉLYAN, A. L. A common method of definition of the parameter of the heterogeneous medium for a given beam path, 5377

KHAIL, F. I. The relativistic clock problem, 1360

KHAIL, H. The magnetic susceptibility of certain organic compounds. IV. The constitution of *ortho*, *meta*, and *para* nitroanilines, 7261

KHAĬLOV, V. V. *See* BALDIN, A. M., 5703, 5721

KHNEVICH, M. H. *See* BULANOVA, A. I., 6147

KHNEVICH, V. V. *See* REĬKHRUDEL', É. M., 6065

KUMO, T. and MAITROT, M. A study of tracks with small multiple scattering and minimum ionization occurring in nuclear emulsions, 6364

ILATZ, J. M. W. *See also* KLUYVER, J. C., 7060

ILATZ, J. M. W., BOESCHOTEN, F. and SMIT, J. A. A spectrometer for measuring relative intensities with the alternating light method, 3976

ILATZ, J. M. W. and VAN ZOLINGEN, J. J. The Brownian motion of electrometers, 6441

ILATZ, J. M. W., VAN ZOLINGEN, J. J. and VAN IPEREN, B. B. The reduction in the Brownian motion of electrometers, 6442

ILATZ, J. M. W. and WAPSTRA, A. H. The influence of microseismic perturbations on a cold damped electrometer, 6443

ILATZ, J. M. W., WAPSTRA, A. H. and VAN WIERINGEN, J. S. A simple method for a Fourier analysis, 6375

MILAZZO, G. Emission spectrum of undecomposed *N* methylpyrrole, 3111*

MILEIKOWSKY, C. A nuclear spectrometer for heavy particles. II. Performance and focusing properties, 6862; III. Astigmatic two-directional focusing in a nuclear spectrometer as a means of eliminating line broadening due to angular energy spread of transmutation particles, 6863. Reaction energy of $O^{18}(p, \alpha)N^{15}$ and the atomic mass of oxygen 18, 7131. Reaction energy of $Ne^{20}(d, \alpha)F^{18}$ by magnetic analysis, 7134

MILEIKOWSKY, C. and WHALING, W. The reaction energies of $Ne^{21}(d, \alpha)F^{19}$ and $Ne^{21}(d, p)Ne^{22}$ from magnetic analysis, 1912

MILES,* J. W. On solutions to the wave equation in hyperbolic space, 1413. Transient loading of a baffled piston, 3053. Transient loading of a baffled strip, 3054

MILES, W. R. Effectiveness of red light on dark adaptation, 5820. Light sensitivity and form perception in dark adaptation, 8145

MILLAR, C. H. Photo-alpha particles from silver and bromine irradiated with 70 MeV bremsstrahlung, 2663

MILLAR, C. H. and CAMERON, A. G. W. Photo-alpha reactions in nuclear emulsions, 7142

MILLAR, D. A. J. *See* BARTHOLOMEW, E. L., JR, 3666

MILLAR, D. D. *See also* ASTBURY, J. P., 1931, 4384, 5718; MCCUSKER, C. B. A., 943, 4185

MILLAR, D. D. and PAGE, D. I. An unusual Ω^0 decay, 8487

MILLAR, G. H., WINANS, J. G., UYEHARA, O. A. and MYERS, P. S. A fast, electro-optical, hot-gas pyrometer, 6732

MILLARD, D. J. The electrical measurement of moisture in granular materials, 5185

MILLBURN, G. P. *See* SCHECTER, L., 5065

MILLER, A. R. The concept of temperature, 809

MILLER, C. W. Travelling-wave linear accelerator for X-ray therapy, 4135

MILLER, D. G. and LEBOEUF, M. B. Effect of high beta backgrounds on precision alpha counting, 6881

MILLER, D. M. and MARTIN, D. S., JR. Radiochemical studies on the photofission of thorium, 5076

MILLER, D. W., ADAIR, R. K., BOCKELMAN, C. K. and DARDEN, S. E. Total cross sections of heavy nuclei for fast neutrons, 456

MILLER, E. C. Zirconium. A structural material for nuclear reactors, 8694

MILLER, F. A. and HANNAN, R. B., JR. The infrared and Raman spectra of dicyanoacetylene, 2352

MILLER, J. H. *See* OPLER, A., 110

MILLER, J. S. On the use of dimensional analysis in general physics, 592

MILLER, K. S. and SCHWARZ, R. J. On the interference of pulse trains, 8586

MILLER, L. E. and HAMM, F. A. A photoconductivity apparatus. I. General circuitry. II. Measurement of transient photocurrents, 4104

MILLER, M. M. Excited levels in Ti^{48}, 1051

MILLER, N. Chemical dosimetry at high dose-rates, 5758

MILLER, P. H., JR and RUSSELL, B. R. Effect of internal strains on linear expansion, X-ray lattice constant, and density of crystals, 535

MILLER, R. *See* ANDERSON, H. L., 1685

MILLER, R. L. Auditory tests with synthetic vowels, 2300. *See also* KOCK, W. E., 1471

MILLER, S. C., JR and GOOD, R. H., JR. A WKB-type approximation to the Schrödinger equation, 6485

MILLER, S. I. *See* MCGEE, P. R., 2591

MILLER, S. L. and TOWNES, C. H. The microwave absorption spectrum of O_2^{16} and $O^{16}O^{17}$, 4714

MILLER, S. L., TOWNES, C. H. and KOTANI, M. The electronic structure of O_2, 4947

MILLER, T. Radiofrequency field quenching of ultra-violet excited phosphors, 771

MILLER, W. *See* MOTZ, J. W., 3561

MILLIGAN, A. G. A method for measuring the potential of a current-carrying electrode, 2015

MILLIGAN, W. O. and WHITEHURST, H. B. An apparatus for the simultaneous determination of adsorption isotherms and magnetic susceptibility, 948

MILLING, B., STEIN, G. and WEISS, J. Action of X-rays on aqueous solutions of perchloric acid, 1221

MILLMAN, G. H. A study of ionospheric winds and turbulence utilizing radio waves, 4499

MILLMAN, P. M. *See* MCKINLEY, D. W. R., 2855

MILLS, B. Y. The positions of six discrete sources of cosmic radio radiation, 9. Apparent angular sizes of discrete radio sources. Observations at Sydney, 1337

MILLS, F. E. *See* GOLDWASSER, E. L., 902

MILLS, I. M., THOMPSON, H. W. and WILLIAMS, R. L. The fundamental vibration-rotation band of hydrogen chloride, 6638

MILLS, O. S. Tables for use in the measurement of interfacial tensions between liquids with small density differences, 6522

MILLS, R. L. *See* CLEWELL, D. H., 7341

MILNER, A. M. *See* MACKENZIE, H. A. E., 7054, 7057

MILNER, C. J. and JAMES, J. A. A camera for texture mapping by X-ray diffraction, 3740

MILNER, P. C. *See* GREEN, L. C., 7050

MILOJEVIĆ, A. Experimental study of rubbers for the membrane of an expansion chamber, 5265

MILOJEVIĆ, A. M. A large-window rectangular β Geiger Mueller counter, 4157

MILONE, A. *See* BARONI, G., 8485

MILONE, C. The energy spectrum of the electrons in extensive cosmic-ray showers, 7766. Penetrating particles in extensive cosmic-ray showers and the stage of development of the showers, 7768. A mechanical hodoscope, 8245

MILUTINOVIĆ, V. and NOVAKOV, S. Determination of surface area of a powder by the ion exchange method, 4629

MINAKAWA, O. *See* KITA, I., 4198

Minami, S. π^0-Meson production by gamma-ray, 466. Excitation function for meson production by γ-ray, 2710. *See also* Sugawara, M., 2948
Minden, H. T. The complete symmetry group for internal rotation in CH_3CF_3 and like molecules, 1809
Mindlin, R. D. and Kane, T. Comments on "A note on critical reflections of elastic waves at free surfaces," 3954
Mineo, C. Hydrostatic theory of the equilibrium configurations of rotating fluid planets and Stokes's theory in the particular case of the earth, 2921
Mineo, M. On a calculation to a further approximation of the deviation of the geodesic from a normal section on any surface, 6439
Mineur, H. The zero-points of the period-luminosity relations for Cepheids, and for R R Lyræ, 2152. Possible influence of the moon on atmospheric precipitation, 5807
Mineur, H. and Peyturaux, R. Numerical evaluation of the integral equation for the sun's limb-darkening in order to derive the source function, 4561
Minnis, C. H. E-region during the solar eclipse of February 25, 1952, 584
Miranda, F. J. *See also* Chick, D. R., 909
Miranda, F. J. and Chick, D. R. The initial performance of a proton accelerator tube; deterioration and its causes, 910
Mirau, A. Device for position location, 3893
Misener, A. D. *See also* Uffen, R. J., 557
Misener, A. D. and Hedgcock, F. T. Tensile strength of liquid nitrogen, 7479
Misenta, R. *See* Becker, E. W., 6511
Miskel, J. A. *See* Perlman, M. L., 7861
Mislow, K. Aromaticity of conjugated monocyclic hydrocarbons, 521
Mitani, K. The direct current associated with microwave gas discharge between coaxial cylinders. I, 1661; II, 1662
Mitchell, A. C. G. *See* Caird, R. S., 2659; Huddleston, C. M., 1880; Smith, A. B., 398, 421
Mitchell, J. J. A study of the formation of iron percarbide, 7231
Mitchell, J. W. *See* Hedges, J. M., 3780, 6354; Keith, H. D., 8162
Mitra, A. N. *See* Majumdar, R. C., 8222
Mitra, A. P. Effects of the variations of recombination coefficient and scale height on the structures of the ionized regions, 2843
Mitra, S. K. Active nitrogen, 5544
Mitra, S. N. Effect of ionospheric irregularities on the variations of phase-path and amplitude of a downcoming wireless wave, 3465
Mitsui, T. and Furuichi, J. Domain structure of Rochelle salt and KH_2PO_4, 4481
Mitter, H. *See* Urban, P., 3356
Miyachi, Y. *See* Kimura, T., 34
Miyagawa, I. *See* Morino, Y., 1811
Miyahara, S. A commentary to Yosida's theory on FeS_n, 317. *See also* Asanuma, M., 329
Miyake, A. *See* Mizushima, S.-I., 3497
Miyake, S. *See* Kusumoto, O., 6124
Miyamoto, G. *See* Kobayashi, Y., 7900
Miyamoto, S. Residual intensity and contour of the solar K-line, 2914. The solar noise from the coronal prominences, 3803. On the anomalous excitation of the chromospheric hydrogen spectrum, 3810. Kinetic temperature of the chromosphere, 7401. Radiation pressure and stability of the atmospheres of early-type stars, 7406
Miyanaga, K. *See* Komori, H., 469
Miyazawa, H. A model for V-particles, 463. Photoelectric emission and energy structure of Cs_3Sb, 4102. *See also* Matsuyama, S. 4340
Miyazawa, T. *See* Kuratani, K., 8037; Mizushima, S.-I., 7258; Nakagawa, I., 1016
Mizushima, M. Theory of the Stark effect of asymmetric rotator with hyperfine structure, 3104
Mizushima, M. and Venkateswarlu, P. The possible microwave absorption in the molecules belonging to the point groups $D_{2d} \equiv V_d$ and T_d, 3996
Mizushima, S.-I. *See also* Kuratani, K., 8037; Nakagawa, I., 1016
Mizushima, S.-I., Shimanouchi, T., Miyazawa, T Ichishima, I., Kuratani, K., Nakagawa, I. an Shido, N. Rotational isomerism in chloroaceton 7258
Mizushima, S.-I., Shimanouchi, T., Nakagawa, L. an Miyake, A. The configurations of rotation isomers and their normal frequencies, 3497
Mladjenovič, M. and Hedgran, A. An investigatio of the RaC gamma-rays from their Compto secondaries, 5028
Moak, C. D. *See* Kunz, W. E., 7912
Moch, R. Some observations of the forecast of β-stab nuclei with even mass number, 1023. *See als* Detœuf, J.-F., 5683
Moe, G., and Duncan, A. B. F. Intensities of electron transitions of acetylene in the vacuum ultraviole 3144. Intensity of electronic transitions of methan and carbon tetrafluoride in the vacuum ultraviole 3145
Moessen, G. W. *See* Aston, J. G., 6002
Moffat, R. D. *See* Graves, G. A., 425
Moffatt, R. J. D. *See* Langer, L. M., 1066, 7081
Moffett, J. C., Ryge, G. and Barkow, A. G. Phas changes in silver-tin amalgams, 549
Moffitt, W. The electronic spectra of conjugate hydrocarbons, 7004
Moffitt, W. and Scanlan, J. Some calculations on th ethylene molecule, 7015
Mohler, F. L. *See* Dibeler, V. H., 3389
Mohler, N. M. and Loofbourow, J. R. Optical filter 765
Mohler, O. C., Pierce, A. K., McMath, R. R. an Goldberg, L. Table of infrared solar line $1{\cdot}4$-$2{\cdot}5\ \mu$, 3814
Mohr, C. B. O. *See* Massey, H. S. W., 383
Mohr, T. Thermo e.m.f. Te/Ag (Experiments on th properties of Te/Ag thermocouples), 8382
Mohrenstein, A. v. *See* v. Mohrenstein, A.
Moiseiwitsch, B. L. The application of variationa methods to atomic scattering problems. III. Th elastic scattering of electrons by helium atoms, 684 *See also* Massey, H. S. W., 5664
Mokrovskiĭ, N. P. and Regel', A. R. Correlatio between variations of density and electronic conductivity during the melting of substances wit diamond or zincblende structure, 6033
Moles, A. Study and representation of the complex not in musical acoustics, 1466. Study and representatio of complex sounds in musical acoustics, 656 Metrology and the classification of measurin apparatus, 7477
Molière, K. *See* Altenhein, H. J., 1268
Mollard, P. Notes on the T-waves, 5788
Möllenstedt, G. Discrete energy losses of 35 ke electrons in exchanges with atoms and molecule 900. On the chromatic losses of electrons in thei passage through matter, 901. Making vacancies i single crystal lamellae visible in the electron microscope, 5133
Möllenstedt, G. and Düker, H. The energy spectrum measured with high resolution, of cathode rays i gaseous discharges, 3337. Emission-microscop surface imaging by means of electrons released b oblique ion bombardment, 6841
Möller, C. *See* Kristensen, P., 2196
Molnar, J. P. *See* Phelps, A. V., 4290
Momma, S. Deduction of the maximum torsional stres in a shaft with notches, 6498
Monahan, J. E. The effective length of an electrostati analyzer, 5525
Mönch, G. C. Thermo e.m.f. Te/metal (Experiments o the properties of tellurium/metal assemblies as fas thermoelements), 8381
Mönch, G. C., Wichert, G. and Böttger, O. Experimental investigation of the bismuth bolometer an theoretical explanation of the results, 8301
Monfils, A. The infrared spectrum and the structur of the molecule SiH_3CL, 5397. *See also* Buyle Bodin, M., 5638
Monfils, A. and Duchesne, J. Vibrational potentia function of the molecule C_2F_4, 4944
Monk, G. S. Remote control engineering. Coloratio of optical glass by high-energy radiation, 2638
Montagner, S. Le. *See* Le Montagner, S.

AUTHOR INDEX

italbetti, R. Nomogram of lifetime-energy-spin for gamma-ray transitions, 7099. *See also* Katz, L., 7138

italbetti, R. and Katz, L. The $O^{16}(\gamma, n)O^{15}$ and $O^{18}(\gamma, p)N^{17}$ reactions, 7143

italbetti, R., Katz, L. and Goldemberg, J. Photoneutron cross sections, 7930

ité, L. A. J. *See* Keesom, W. H., 4065

iticelli, F. On the methods of solution of electrophoton cascade equations, 1721

itroll, E. W. Markoff chains, Wiener integrals, and quantum theory, 2176. *See also* Newell, G. F., 6933

odie, M. M. and Reid, C. Inter- and intramolecular energy transfer processes. II. Hydrocarbon-hydrocarbon systems, 347

ody, H. *See* Katz, L., 7137

on, P. A scale for specifying frequency levels in octaves and semitones, 5351

on, P. and Spencer, D. E. Theory of the photic field, 3082. Binary stars and the velocity of light, 7419

on, P. B. Some scientific applications of high speed-rotation, 4627

on, P. B. and Storruste, A. Resonant nuclear scattering of ^{198}Hg gamma-rays, 7113

oney, M. A test of the theory of secondary viscoelastic stress, 5871

oney, M. and Black, S. A. A generalized fluidity power law and laws of extrusion, 2771

ore, A. J. W. Accommodation kinking associated with the twinning of zinc, 2803

ore, A. R. *See* Pantchechnikoff, J. I., 862

ore, D. W. *See* Burkardt, L. A., 6000

ore, E. B. *See* Cole, A., 7108

ore, K. H. *See* Holzman, G. R., 5200

ore, M. G. A quasi-relativistic theory of gravitation, 2174

ore, R. K. Theory of radio scattering from the aurora, 3458

ore, R. V. The control of a thermal neutron reactor, 1926, 4377

ore, W. J. Flow of oxide layer during oxidation of copper, 6247

orhouse, R. G. Pair creation in intermediate coupling theory, 3569. Mesonic interpretation of nuclear properties, 4610

oring, F. P. *See* Kaufmann, S. G., 1105

s, W. S. Roentgen therapy dose computing device, especially for rotation therapy with high energy (2 MeV), 2869

s, W. S. and Webster, E. W. An automatic tissue dose computer for use in supervoltage rotational therapy, 4537

ales, M. F. *See* Blum, J. J., 784

and, M. *See also* Tsai-Chü, 7776

and, M., Avignon, Y., van Rossum, L. and Desprez, R. Determination of the latitude effect of the cosmic ray intensity by means of nuclear emulsions, 3414

and, M. and Tsai-Chü. On the angular distribution, the momentum spectrum and the E-W asymmetry of the cosmic-ray nucleon component studied using a nuclear emulsion, 2527

awetz, C. S. and Kolodner, I. I. On the nonexistence of limiting lines in transonic flow, 6545

eau, J. *See* Bretonneau, P., 5517

eau, J.-J. The theory of turbulence relating to a moving profile in the non-stationary régime, 645

ellet, D. *See* Crussard, J., 3616, 5560, 7173; Kayas, G., 8304

ey, G. W. The flow of glass at room temperatures, 1166

gan, C. G. *See* Jones, F. Llewellyn, 6079

gan, E. R. *See* Piercy, G. R., 4910

gan, G. D. High frequency discharges in gases, 3330

gan, G. W. Remarks on the problem of slow motions in a rotating fluid, 5878

gan, H. W. and Goldstein, J. H. The microwave spectrum of vinylacetylene, 1528

gan, K. Z. *See* Davis, D. M., 2642

gan, M. G. A review of v.h.f. ionospheric propagation, 6156

, I. *See* Hashimoto, Y., 2040

Mori, T. *See* Ishiguru, M., 850

Morilleau, E., Dormont, H. and Champeix, R. Photomultipliers specially adapted for scintillation counters, 4880

Morinaga, H. and Fry, W. F. Nuclear capture of negative μ mesons in photographic emulsions, 8696

Morino, Y. and Kuchitsu, K. A note on the classification of normal vibrations of molecules, 1003

Morino, Y., Miyagawa, I. and Wada, A. Internal rotation in dichlorobutine, 1811

Morita, M. Interference terms of the electron-neutrino angular correlation, 7093. *See also* Yamada, M., 8658

Morita, M. and Yamada, M. On the β–γ angular correlation of Sb^{124}, 8660

Morita, S. *See* Nonaka, I., 256

Moriyama, F. *See* Hatanaka, T., 7397

Moriyama, M. Concentration dependence of the dielectric constant of ionic solutions, 8388

Morley, R. C. Proposed method for producing short intense monoenergetic ion pulses, 269

Moroz, L. S. Causes of the diffuseness of interference lines in X-ray photographs of quenched carbon-free alloys of iron, 6273

Morozumi, C. and Ritter, H. L. Calculated powder patterns from very small crystals: body-centered cubic cubes, 8085

Morpurgo, G. On the binding energies of H^3 and He^4, 1832. The correspondence between classical and quantum electrodynamics, 7432. On the binding energy of He^5 and Li^6, 8635

Morris, H. N. *See* Kellogg, W. N., 4675

Morris, W. E., Stambaugh, R. B. and Gehman, S. D. Ultrasonic method of tire inspection, 1453

Morrish, A. H. Nuclear interactions of 210-MeV π^--mesons in emulsions, 5109. The grain density in the tracks of 117- and 222-MeV π^--mesons in emulsions, 8170. *See also* Happ, W. W., 8164

Morrison, C. L. *See* Ludeke, C. A., 2898

Morrison, G. C. *See* Lees, C. F., 3370, 4348

Morrison, H. L. and Plain, G. J. Thermocouple temperatures in a diffusion cloud chamber, 931

Morrison, H. L. and Rogers, F. T., Jr. Significance of flow-patterns for initial convection in porous media, 179

Morrison, J. A. *See also* Drain, L. E., 5176

Morrison, J. A., Drain, L. E. and Dugdale, J. S. Phase transitions in multimolecular layers of adsorbed nitrogen, 2796

Morrison, J. L. and Grummitt, W. E. The accommodation coefficient technique applied to a study of molecular oxygen film on tungsten, 4452

Morrison, R. B. The variation with distance in the range 0–100 km of atmospheric wave-forms, 8819

Morrow, J. C. Vapor-liquid equilibria in He^3-He^4 solutions, 3253

Morse, P. M. Excitation of molecular rotation-vibration by electron impact, 4255

Morse, R. W. Acoustic propagation in granular media, 674

Mortlock, A. J. *See* Harper, A. F. A., 6590

Morton, G. A. *See* Greenblatt, M. H., 930

Morton, G. F. and Gough, V. E. The optical projection of the profile of an article at a given cross-section, 6687

Morton, J. Y. The impedance of the human mastoid, 2865

Morton, K. W. *See* Lomer, W. M., 7815

Mosberg, W. H., Jr. *See* Wall, P. D., 4521

Moser, H. *See also* Brandmüller, J., 151

Moser, H. and Schmidt, W. The use of the minimum light criterion in spectroscopic investigations, 6601

Moses, H. A. *See* Spence, R. D., 3435

Moses, H. E. The canonical transformation for an electron-positron field coupled to a time-independent electromagnetic field, 2189. Exchange scattering in a three-body problem, 6477. A note on the application of Schwinger's variational principle to Dirac's equation of the electron, 8229

Mosher, W. A. *See* Naimark, G. M., 4522

Moshinsky, M. Transient effects in scattering by a rigid sphere, 625. Diffraction in time, 632. On a class of integral transform in nuclear dispersion, 4608. Poles of the *S* matrix for resonance reactions, 7460

Moskowitz, D. *See* Glaser, F. W., 6249

Moss, G. *See* Rose, H. D., 1652

Moss, H. A recurrent sweep chronograph for the measurement of small time intervals especially in ballistics, 6507

Moss, T. S. Photoconductivity in the elements, 234. Inter-relation between optical constants for lead telluride and silicon, 3094

Mostovetch, N. An experimental study of the electrical conductivity of very thin metallic deposits obtained by thermal evaporation, 4797

Moszowski, S. A. Lifetimes of nuclear isomers, 2650

Motokawa, K. and Ebe, M. Retinal receptors isolated with a.c. method and polychromatic theory, 4528

Mott, B. W. and Haines, H. R. The effect of strain in objective lenses used for microscopical examination of metals under polarized light, 4750

Mott, B. W. and Williams, J. The thermal etching of uranium, 8052

Mott, G. *See* Guernsey, G., 455; Nelson, B. K., 433

Mott, G. R., Guernsey, G. L. and Nelson, B. K. Total cross sections of carbon and hydrogen for high energy neutrons, 454

Mott, N. F. A theory of work-hardening of metal crystals, 1991. A discussion on theory of liquids: Introductory remarks, 2237. Dislocations and the theory of solids, 3732. Note on the electronic structure of the transition metals, 4240. A theory of work-hardening of metals. II. Flow without slip-lines, recovery and creep, 7996

Mott, W. E., Sutton, R. B., Fox, J. G. and Kane, J. A. Differential cross section for elastic *p-p* scattering at 435 MeV, 6095

Mott-Smith, H. M. Change of electron temperature in an electron beam, 3386

Mottelson, B. R. *See* Bohr, A., 2668, 6166, 6212

Motulevich, G. P. and Fabelinskiĭ, I. L. Molecular scattering of light in liquids, 5425

Motz, H. and Schiff, L. I. Čerenkov radiation in a dispersive medium, 4144

Motz, H., Thon, W. and Whitehurst, R. N. Experiments on radiation by fast electron beams, 6852

Motz, J. W., Miller, W. and Wyckoff, H. O. 11-MeV thick target bremsstrahlung, 3561

Motz, L. Gauge invariance and classical electrodynamics, 2190. *See also* Epstein, I., 3806; Frieman, E. A., 2691

Motzo, M. Theoretical resonance curves of interaction between electromagnetic waves, for vertical incidence in the ionosphere, 2573

Moucharafyeh, H. Study of isolated tracks produced in nuclear emulsions by cosmic radiation, 1732

Moullin, E. B. On the current induced in a conducting ribbon by a current filament parallel to it, 7799

Moussa, A. A prismatic beta spectrometer with double focusing using ironless coils, 4853

Moussard-Briot, A.-M. *See* Brenet, J., 1218

Mousuf, A. K. K^{40} radioactive decay: its branching ratio and its use in geological age determinations, 410

Mower, L. Tables for second Born approximation scattering from various potential fields, 3360

Moyer, B. J. *See* Hales, R. W., 3620

Mozley, R. F. and Shoemaker, F. C. A fast neutron scintillation spectrometer, 478

Mrozowski, S. Electric resistivity of interstitial compounds of graphite, 3302

Muehlhause, C. O. *See also* Harris, S. P., 7186*; Hibdon, C. T., 1092

Muehlhause, C. O. and Thomas, G. E., Jr. Two liquid scintillation neutron detectors, 4396

Mueller, C. R. Chemical valency theory and the electronic structure of the methane molecule, 3511. Semi-localized orbitals. IV. Relationship of *n*-center orbitals, two-center orbitals and bond properties, 3512. Unified orbital theory of the excited states of the fluorine molecule, 6164. *See also* Cahill, J. M., 8627

Mugibayashi, N. and Kawaguchi, M., 8232

Mühleisen, R. Positive and negative electric space charges in atmospheric air in fine weather, 1293

Mühleisen, R. and Holl, W. A new method of measuring the electrical space charge density of the air, 4516

Muirhead, H. *See* Lees, C. F., 4348

Mukai, T. Anisotropic property of single-crystal of aluminium, 1193

Mukerji, S. K. and Lal, B. On the Raman spectra
p-diphenylbenzene in various solutions, 1552. the Raman spectrum of thianthrene in the molt state, 4034. On the Raman spectra of thianthrene various solutions, 7598

Mukherjee, S. K. Experiments on the internal disp sion of optical waves, 3002. *See also* Dutta, A. 3000

Mulcahy, M. F. R. and Watt, I. C. The kinetics oxidation of benzaldehyde. I. Survey of the reacti in solution, 3684; II. The kinetics of the uncataly reaction in solution, 3685

Mulder, M. M. *See* Green, L. C., 7050

Mullen, E. B. A new vector identity and physi application, 206

Muller, C. A. *See* Oort, J. F. H., 3824

Muller, D. E., Hoyt, H. C., Klein, D. J. and DuMo J. W. M. Precision measurements of nucl γ-ray wavelengths of Ir^{192}, Ta^{182}, RaTh, Rn, W Cs^{137}, Au^{198}, and annihilation radiation, 1084

Müller, E. W. *See* Drechsler, M., 6078

Müller, F. H. Plastic and elastic properties of h polymers and the kinetic theory of matter, 7222

Müller, M. Magnetic electron optics in long-be amplifier tubes, 4848

Muller, N. *See* Pickett, L. W., 8624

Müller, P. An investigation on Geiger–Müller count with X-ray impulses, 1695. The law of associat by magnitudes of the components in double sta 6433. Two instruments (giving) double images w a large separation for micrometric measures astronomy, 7383

Müller, R. A rigorous treatment of the diffraction electromagnetic waves by a plane grating, 3452. the rotation of the inner corona, 6426. Correlat of magnetic M-storms with the monochrom corona, 7340. *See also* Ritschl, R., 15 v. Erichsen, L., 1901

Müller, R. and Westpfahl, K. A rigorous treatm of the diffraction of electromagnetic waves at a 6154

Muller, T., Richert, R. and Gorodetzky, S. On use of a Rosenblum counter with coincide systems of short response times, 2506

Mulligan, J. F. *See* Brennan, R. O., 358

Mulliken, R. S. *See* Glusker, D. L., 7570; Pick L. W., 8624

Mulvey, T. The magnetic circuit in electron mi scope lenses, 7720. *See also* Haine, M. E., 262

Mülwert, H. H. The operation of acoustic detec on low-frequency-modulated ultrasound in gases,

Munakata, Y. *See* Hayashi, C., 2944

Mund, W., Feyten, J. and Huyskens, P. Sup mentary remarks on the determination of molec weights by effusion method, 5182

Munesue, S. *See* Sakurai, T., 4084

Mungall, A. G. *See* Middleton, W. E. K., 1564

Muñiz, E. Ortiz. *See* Ortiz Muñiz, E.

Munk, M. M. The gas flow past slender bodies, 53

Munro, G. H. Travelling disturbances in the io sphere: diurnal variation of direction, 5800. flexions from irregularities in the ionosphere, 88

Münster, A. Statistical mechanics of phase cha II. Changes of higher order, 2427

Mura, A. *See* Lovati, A., 7761

Murai, T. *See* Araki, G., 362*

Murakami, T. Atomic distribution in binary solutions. I. General theory, 2583; II. Mod theory for the case of nearly equal concentrati 2584; III. Diffuse scattering of X-rays by bi alloys, 2585; IV. The influence of the short-r order on the electrical resistivity of alloys, 7816

Murakawa, K. Hyperfine structure of the spectru tungsten, 3988. Hyperfine structure of the spect of Mg I, 3989. On some regularities in the iso effect in the spectrum of lead, 5949. Hype structure of the spectrum of ruthenium, 7559

Murata, H. The Raman spectra of vinyl- and dichl vinyltrichlorosilane, 3169

Murata, H. and Kumada, M. The Raman spect hexamethyldisilane and hexamethyldisiloxane, 5

Murav'ev, Yu. K. *See* Kontorovich, M. I., 5939

Murgai, M. P. Detonation of proton gas, 4347. detonation of pentaerythritol tetranitrate, 8734

rgatroyd, W. Damping of turbulence by a magnetic field, 2991
roga, S. On the capacity of a discrete channel. I. Mathematical expression of capacity of a channel which is disturbed by noise in its every one symbol and expressible in one state diagram, 8182
rray, H. D. [Ed.]. Colour in theory and practice, 2393
rray, J. J. *See* Hoyt, H. C., 5038
rray, R. L. Storage of radioactive gases from reactor operation, 2732
rray, R. L. and Menius, A. C. Fast fission factor for hollow natural uranium cylinders, 7156
rray, R. L. and Ratner, L. T. Electric fields within cyclotron dees, 2496
scia, C. Study of an electronic [magnetic] lens with the WKB method, 2482
ser, H. A quantum-statistical treatment of the internal photo-effect, 3473. *See also* Genzel, L., 6056
stel', E. R. Electrical models of the wave equation of quantum mechanics. (Investigation of potential barriers), 5865. Origin of supernovae outbursts, 7390
sulin, B. *See* Frost, A. A., 4262
sumeci, L. On aberrations in mass spectrometers with magnetic sectors, 1687
to, T., Tanifuji, M., Inoue, K. and Inoue, T. Interaction of μ meson with matter. II. Spontaneous decay of negative μ meson, 2954
to, T. and Watanabe, M. Theory of the nuclear magnetic relaxation in crystalline solids. I. Direct process, 8771
to, Y. *See* Fukuroi, T., 4100
ers, H. P. The secondary emission from copper and silver films obtained with primary electron energies below 10 eV, 2494. A simple varying capacitor method for the measurement of contact potential difference in high vacuum, 7650
ers, P. S. *See* Millar, G. H., 6732
ers, V. Intermolecular forces in acetone and methyl alcohol, 993
ers, W. R. The construction of small solenoids for the production of intense magnetic fields, 7790
erson, A. L. and Eicher, J. H. The viscosity of gaseous uranium hexafluoride, 3016
sels, K. J. Electric polarizability of polar ions, 2438

barro, F. R. N. *See* Cottrell, A. H., 8612
bholz, H., Stoll, P. and Wäffler, H. (γ, a) processes in Li_3^7, O_8^{16}, Br_{35}^{79} and Br_{35}^{81}, 5704
chtrieb, N. H. *See* Fryxell, R. E., 7249; Saltman, W. M., 5755
dai, A. Strain-hardening and softening with time in reference to creep and relaxation in metals, 493
gahara, S. The scattering of slow electrons by the diatomic molecules. I. General theory, 4139
gahara, T. and Fujimura, J. Some remarks on the photo-disintegration of deuteron. I, 3596
gamatsu, H. T. *See* Willmarth, W. W., 187
gata, C. *See* Fukui, K., 3487, 3503
gata, T., Akimoto, S. and Uyeda, S. Reverse thermo-remanent magnetism, 963; II, 964
gel, B. C. H. *See* Hulthén, L., 4359
gel, E. *See* Wu, C. S., 7085
gelschmidt, G. *See* Gordon, R. L., 4461
geotte, E. *See* Price, B. T., 3407
gle, D. E. *See* Anderson, H. L., 7176
gy, E. Temperature dependence of willemite luminescence, 2371
gy, E. and Bodó, Z. Luminescence of willemites containing manganese and iron, 1544
gy, J. Determination of the excitation function of $_{12}\text{Mg}(d, n)_{14}\text{Si}$ nuclear processes, 7124
hmias, M. and Yuasa, T. A measurement of the upper energy limits of the β^+ spectra of the mirror nuclei P^{29} and Cl^{33}, 7883
imark, G. M. and Mosher, W. A. Effects of sonic vibration on the proteolytic activity of pepsin, 4522
kabayasi, K. and Sato, I. Nuclear forces in pseudoscalar meson theory, 54
kada, I. *See* Kambe, K., 1613
kada, M. P. *See* Fretter, W. B., 1944
kagawa, I. *See also* Mizushima, S.-I., 7258
Nakagawa, I., Ichishima, I., Kuratani, K., Miyazawa, T., Shimanouchi, T. and Mizushima, S. I. Rotational isomers of chloroacetyl chloride, bromoacetyl chloride, and bromoacetyl bromide, 1016
Nakagawa, L. *See* Mizushima, S.-I., 3497
Nakai, H. *See* Kamefuchi, S., 51
Nakamoto, K. and Suzuki, K. Direct evidence for the $n \rightarrow \pi$ electronic transition of the nitroso-absorption, 1515
Nakamura, S. Meson theory of β-decay and the ΔL-forbidden transitions, 1889
Nakamura, T. On the spin wave theory of magnetic susceptibility and resonance absorption in antiferromagnetics, 3424
Nakamura, T., Ohno, K. and Kotani, M. Interaction of π-electrons in the acetylene molecule, 8618
Nakano, T. and Nishijima, K. Divergences arising from nuclear forces, 28. The *S*-matrix method in pion reactions, 2955
Nakano, T., Nishimura, J. and Yamaguchi, Y. On the short μ-meson tracks from π-meson decays, 468
Nakano, Y. On Bowden's stick-slip lengths of surface friction, 2774. On the angular distribution of D + D nuclear reaction products, 3581. *See also* Umeda, K., 2773
Nakaya, U. An electron microscope study of snow crystal nuclei, 5246
Nakayama, T. *See* Yamaguchi, S., 6256
Nambu, Y. An empirical mass spectrum of elementary particles, 4383
Nambu, Y., Nishijima, K. and Yamaguchi, Y. On the nature of *V*-particles. I–II, 299
Name, F. W. Van, Jr. *See* Van Name, F. W., Jr.
Nankivell, J. F. A method of observing selected areas in electron and optical microscopes, 7973
Narasimhan, P. T. Bond moments and induced moments, 368
Náray, Z. On the wave-mechanical theory of the HCl molecule, 2587
Narayanan, P. S. Raman spectrum of carborundum, 775
Narbutt, K. I. *See also* Barinskiĭ, R. L., 5504, 5507; Vaĭnshteĭn, É, E., 5506, 6071
Narbutt, K. I., Vaĭnshteĭn, É. E. and Barinskiĭ, R. L. The relation of the structure of the fundamental X-ray absorption edge to the X-ray emission spectra for atoms in molecules and polar crystals, 5505. The structure of the fundamental X-ray absorption edge for ions in solution, 5508
Nariai, H. On Hoyle's continuous creation theory, 3797
Narita, S. Relationship between thermionic emission and electrical conductivity of oxide-coated cathodes, 6907
Narsimhan, G. On the mechanism of viscosity of polymer solutions, 5317
Nash, K. L. and Lister, N. W. Streaming potential and electro-osmosis. Mechanism of electro-osmosis, 1652
Nasielski, J. On the specific molar quantities in the cell model of solutions, 3011
Nassenstein, H. *See* Schaefer, C., 3192
Nastuk, W. L. *See* Alexander, J. T., 8140
Nataf, R. The β-decay nucleon-lepton interaction according to experiment, 5012. Nuclear matrix elements of β transitions for odd nuclei, 5652. *See also* Bouchez, R., 7036; Marty, C., 7838
Nathans, R. *See* Halpern, J., 1125, 1129, 1947
Naudé, S. M. and Hugo, T. J. The emission spectrum of aluminium monofluoride, 4698
Naughton, J. J. A solubility determination of some elemental gases in Pyrex at 1170° c, 3925
Naumann, R. A. *See* Forsthoff, C. W., 7074
Naumann, V. O. *See* Wahlin, H. B., 2752
Naurits, L. N. *See* Ilyukhin, N. V., 6013
Naves, Y.-R. The ultraviolet absorption spectra of the aliphatic terpenic alcohols from 2000 to 2200Å, 7569
Navon, D., Bray, R. and Fan, H. Y. Lifetime of injected carriers in germanium, 849
Nawata, S. On the lamellar reflectivity for multiple reflections, 4037. On the phase shift accompanying reflection of light from evaporated films and the change of effective refractive index as function of the thickness of deposit, 4039
Naylor, P. F. D. *See* Lippold, O. C. J., 570
Naylor, T. K. *See* Esmail-Begui, Z., 2304

Neamtan, S. M. On the physical interpretation of solutions of the Dirac equation for a free particle, 44
Neamtan, S. M. and Vogt, E. Boundary conditions in the mechanics of fields, 6454
Nedoluha, A. and Koch, K. M. The mechanism of resistance changes in a magnetic field, 213
Nedzel, A. V. *See* Marshall, J., 8677. *See also* Nedzel, V. A.
Nedzel, V. A. Total cross sections for 400-MeV neutrons, 5082. *See also* Marshall, J., 1147; Nedzel, A. V.
Néel, L. Antiferromagnetism and ferrimagnetism, 1746. Some new results in antiferromagnetism and ferromagnetism, 8532. Thermoremanent magnetization of fine powders, 8580
Negishi, K. *See* Torikai, Y., 2286
Neher, H. V. An automatic ionization chamber, 3378. A barometer element for radio-sondes, 3767
Neher, H. V., Peterson, V. Z. and Stern, E. A. Fluctuations and latitude effect of cosmic rays at high altitudes and latitudes, 4899
Neĭding, A. B. and Kazarnovskiĭ, I. A. Magnetic susceptibility and the structure of the peroxides, 522
Neill, J. C. *See* Stout, G. E., 5806
Neilsen, H. Polarization of light from the sky, 8815
Neilson, G. C. *See* Barnes, C. A., 7130
Nelipa, N. F. Quantum theory of the radiating electron, 5521
Nelkowski, H. *See* Krebs, K., 7560
Nelson, B. K. *See also* Guernsey, G., 455; Mott, G. R., 454
Nelson, B. K., Guernsey, G. and Mott, G. Neutron energy distributions from Be, C, and Pb bombarded by 245-MeV protons, 433
Nelson, C. N. *See* Sorem, A. L., 8174
Nelson, E. B. *See* Schrader, C. D., 5030
Nelson, J. B. X-ray scattering of coals, 1969
Nelson, R. A. *See also* Band, W., 6008
Nelson, R. A. and Band, W. The vapor pressure of He^3–He^4 mixtures, 1585
Nelson, R. D. *See* Lippincott, E. R., 6618
Nenning, P. *See* Kübler, A., 3376
Nenno, S. *See* Tagaya, M., 547
Neppiras, E. A. A high frequency reciprocating drill, 3063
Nereson, N. Fission neutron spectrum of Pu^{239}, 1142
Nereson, N. and Darden, S. Average neutron total cross sections in the 3- to 12-MeV region, 2724
Nesbitt, E. A. and Heidenreich, R. D. The physical and magnetic structure of the Mishima alloys, 8556
Nester, W. H. *See* Cork, J. M., 1054, 4304, 4995, 5000, 7079
Nethercot, A. H., Jr. Molecular spectroscopy with a Hertzian oscillator source of millimeter waves, 4017
Nethercot, A. H., Jr and Javan, A. The microwave spectrum of $C_8H_{13}Br$ and $C_8H_{13}Cl$, 2336
Netushil, A. V. and Lisenkov, A. A. Measurement of the temperature of dielectrics and semiconductors in high-frequency fields, 8378
Neu, J. T. Construction of a dual beam heated infrared cell, 5945
Neubauer, R. L. *See* Vonnegut, B., 5175
Neuer, J. J. *See* Mack, R. C., 7875
Neuert, H. *See also* Lindberg, A., 872
Neuert, H. and Gutbier, H. On counter tubes with methylene halide vapour fillings, 1696
Neuert, H. and Retz-Schmidt, T. Measurement of the phosphorescence decay of some alkali halides, 5971
Neufeld, J. Ionization and excitation losses of charged particles of intermediate energies, 6860
Neugebauer, H. E. J. Theory of masking for color correction. I. Masks drawn from the subject, 1326. A new method of solving diffraction problems, 1779
Neugebauer, H. J. Clausius–Mosotti equation for anisotropic crystals, 1605
Neugebauer, T. The mutual polarization of ions in lattices, 6310
Neuman, M. The radiation of a high energy electron in a constant magnetic field, 4862
Neumann, B. and Koch, K. M. The Ettingshausen effect in Bi–Pb alloys, 6807
Neumann, J. On the semi-diurnal wave of atmospheric vapour pressure, 565
Neuringer, J. L. and Hudson, G. E. An investigatio of sound vibrations in a tube containing a hea source, 671
Neuroth, N. *See* Genzel, L., 4719
Nève de Mévergnies, M. *See* de Mévergnies, M. Nèv
Neven, L. *See* Migeoette, M., 4568; Vigroux, E., 66
Neville, O. K. Carbon-14 sample preparation an counting techniques. I. Gas counting methods, 26
Nevin, T. E. *See also* Keefe, D., 275
Nevin, T. E. and Stephens, D. V. New observatio on the band spectra of MnH and MnD, 6613
Newbery, S. P. *See* Mayneord, W. V., 4538
Newell, G. F. and Montroll, E. W. On the theory the Ising model of ferromagnetism, 6933
Newlands, M. The disturbance due to a line source a semi-infinite elastic medium with a single surfa layer, 2261.
Newman, E. *See* Cohen, B. L., 5701
Newman, R. Polarized infrared spectrum of sodiu formate, 137
Newns, H. C. The theory of (d, t) reactions, 191 Polarization effects in (d, p) and (d, n) reactions, 71
Newth, J. A. *See* Astbury, J. P., 1931, 4384, 5718
Newton, J. O. and Rose, B. The gamma-radiati from Am^{241}, 4322
Neyman, J. and Scott, E. L. A theory of the spati distribution of galaxies, 2155
Neyman, J., Scott, E. L. and Shane, C. D. On t spatial distribution of galaxies. A specific mod 3825
Nicholas, J. F. Effect of the Fermi energy on t stability of superlattices, 3728. *See also* Boas, W 4422
Nicholls, R. W. The spectrum of an argon-nitroge mixture excited in an high voltage arc, 4126
Nicholson, A. J. C. The stability of the acetyl radic 1203
Nickerson, D., Tomaszewski, J. J. and Boyd, T. Colorimetric specifications of Munsell repaints, 31
Nickerson, J. F. Estimating the extent of frequen modulation by means of a stroboscope, 7535
Nickson, A. F. B. An accurate method of measuri frequency in the audio range, 1470
Niclause, M. *See* Fillet, P., 5743
Nicodemus, D. B. and Staub, H. H. Fission neutr spectrum of U^{235}, 4371
Nicodemus, F. E. Radiometer calibration for extende source measurements, 6580
Nicol, J., Smith, T. S., Heer, C. V. and Daunt, J. G. new type of heat interchanger for large liquefie 2423
Nicolini, L. A new dielectric material, 830
Niday, J. B. *See* Turkevich, A., 2728
Niehrs, H. *See* Altenhein, H. J., 1268
Nieke, H. The semiconducting properties of cupro oxide. VII. The Hall effect below room temper ture, 8403
Niekerk, J. N. van. *See* van Niekerk, J. N.
Nielsen, A. H. *See also* Duchesne, J., 1810
Nielsen, A. H. and Woltz, P. J. H. The infrar spectrum of chlorine dioxide, 1530
Nielsen, C. E. *See* Frost, R. H., 7727; Lander, R. 2390
Nielsen, G. *See* Ingram, M., 2868
Nielsen, H. H. The molecular structure of arsine, 182 The infrared spectra and the molecular structure pyramidal molecules, 1824
Nielsen, J. R. *See also* Chi Yuan Pan, 7821; Claasse H. H., 4730
Nielsen, J. R., Claassen, H. H. and Smith, D. Infrared and Raman spectra of fluorinated ethylene V. Hexafluoropropene, 1532
Nielsen, J. R. and Gullikson, C. W. Raman spectru of gaseous ethforane, 8337
Nielsen, J. R., Liang, C. Y. and Smith, D. C. Infrar and Raman spectra of fluorinated ethanes. VI. T series CF_3CH_3, CF_3CH_2Cl, CF_3CHCl_2, an CF_3CCl_3, 5961
Nielsen, J. R., Liang, C. Y., Smith, D. C. and Alper M. Infrared and Raman spectra of fluorinat ethanes. VII. CCl_3CF_2Cl and CCl_3CFCl_2, 5962
Nielsen, J. R., Liang, C. Y., Smith, R. M. and Smi D. C. Infrared and Raman spectra of fluorinat ethanes. V. The series CF_3CF_3, CF_3CF_2 CF_3CFCl_2, and CF_3CCl_3, 3142

lsen, M. *See* Arley, N., 4492

r, A. O. *See* Johnson, E. G., 6837

renberg, W. A. *See* Hobson, J. P., 3716

ssen, K. F. Condition for vanishing spontaneous magnetization below the Curie temperature, 6941

ontoff, N. On the effect of fluctuations of crystal detectors, 855. Study of the potential barrier separating two electrodes of the same metal at different potentials, 6784. Study of the electrical conduction by tunnel effect for an imperfect contact between two identical metals, 7674. Comparison, for an imperfect contact between two metals, of the conductivity resulting from tunnel effect and from thermal excitation of electrons over the potential barrier, 8419. *See also* Blanc-Lapierre, A., 6487

htingale, R. E., Cowan, G. R. and Crawford, B. Jr. Application of a fast-scanning infrared spectrometer to a kinetic study of the NO_2–C_2H_5 OH reaction, 8733

on, J. P. *See* Stephanou, S. E., 1522

mi, T. On the changes of contact potential difference of a germanium rectifier during the electrical forming, 6050*

ra, K. Influence of σ-electrons on the lower excited electronic levels of benzene, 355

boer, B. R. A. Note on the electric and the diamagnetic susceptibilities of compressed gases, 7662

itin, A. A. On the problem of the appearance of oxygen lines in the spectrum of the sun and of certain stars, 6428. Evaluation of the population of the unstable levels in the helium atom in stellar envelopes and nebulae, 7403

itine, S. and el Komoss, S. G. Application of the metallic model to the calculation of some interesting cyanines, ramifications being taken into account, 3505. Theoretical and experimental study of the absorption spectra of some dyes, 3506

clas, A. *See* Schäfer, H., 1423

clas, L. and Lauterjung, K. H. Maximum energy of the neutrons from capture of negative μ-mesons by iron nuclei, 6220

sson, I. A scaler using dekatron scaling tubes, 283

eroff, I. Propagation of errors in spectrophotometric colorimetry, 5988

ura, T. and Shibayama, K. The radiation impedance of ribbon type sound radiators, and the vibro-motive force on them, 1459

ura, T. and Watanabe, Y. Effect of a finite circular baffle board on acoustic radiation, 2280

hijima, K. Generalized Furry's theorem for closed loops. I–II, 45. On the adiabatic nuclear potential. II, 52. On Lagrangian formalism, 8214. *See also* Nakano, T., 28, 2955; Nambu, Y., 299

hikawa, T. and Shimoda, K. New lines of the inversion spectrum of ammonia, 7572

himura, H. and Takamura, J. Role of deformation bands in the plastic deformation of metallic single crystals, 3652

himura, J. *See also* Nakano, T., 468

himura, J. and Ida, K. Note on the cascade function for heavy elements, 305

himura, J. and Kamata, K. On the accuracy of the Molière function. II, 263

hiyama, T. On the velocity operator in quantum mechanics, 56. On the plasma-like oscillation, 255

hiyama, Z. *See also* Shimomura, Y., 1259; Tagaya, M., 547

hiyama, Z. and Iwanaga, R. On the crystal structure of manganese nitrides, 546

i, H. *See* Tomita, G., 153

sen, W. *See* Lochte-Holtgreven, W., 1710

ta, I. *See* Okaya, Y., 543–4

zsche, K. *See* Eckardt, A., 8282

on, W. C. *See* Cosslett, V. E., 2130, 5509

akes, G. E. and Allin, E. J. Interference effects in the small angle scattering of X rays by small particles, 1674

bbs, J. M. The automatic electrical ignition of the d.c. arc in spectrographic analysis, 4754

ble, G. A. *See* Hutchison, C. A., Jr, 323

dtvedt, H. Magnetostrictive effect and the Δ–*E* effect in nickel, 989

egel, F. W. *See* Cooper, C. D., 1534

lle, A. W. Small-signal impedance of short tubes, 2278

Nolle, A. W. and Mifsud, J. F. Ultrasonic-wave study of swollen Buna-N rubber, 2263

Nomarski, G. The simultaneous use of multiple beam interference and phase contrast in the study of transparent and reflecting "phase objects," 3204. Phase plate in the form of a narrow strip, its properties and applications, 3218. *See also* Françon, M., 3213

Nomoto, O. Molecular sound velocity and molecular compressibility of liquid mixtures, 6527, 7526

Nonaka, I., Morita, S., Takesita, K., Kawai, N., Ishimatsu, T., Suematsu, S. and Takei, C. Characteristics of the point-to-plane corona discharges in air at high pressures, 256

Nordheim, L. W. Laternal scattering moments in showers, 1725

Nørgaard, C. *See* Arley, N., 4492

Norinder, H. Thunderstorms. The electric field variations radiated from lightning discharges, 1294. *See also* Vassy, A., 6600

Norinder, H. and Salka, O. Mechanism of long-gap negative spark discharges in air at atmospheric pressure, 3328

Norinder, H. and Siksna, R. Ions formed by corona discharge, 1709. Ions produced in the air at atmospheric pressure by ultra-violet light from a quartz-mercury arc, 2512. Ions formed in a room by negative wire corona, 3327. Ions formed in a room by positive wire corona, 4116

Norman, A. *See also* Greenfield, M. A., 1683

Norman, A., Greenfield, M. A. and Kratz, P. M. Radiation induced by alpha-particles in thin films, 4449

Norris, K. P. *See* Wilkins, M. H. F., 1567

Norrish, R. G. W. *See also* Christie, M. I., 3482. Khan, M. A., 8022

Norrish, R. G. W., Porter, G. and Thrush, B. A. Studies of the explosive combustion of hydro-carbons by kinetic spectroscopy. I. Free radical absorption spectra in acetylene combustion, 3246. Chemiluminescent phenomena during hydrocarbon combustion, 8342

Norton, F. J. Diffusion of D_2 from D_2O through steel, 5122

Nöske, H. and Schmidt, E. The velocity of cathode [vapour] streams in low pressure mercury arcs, 3332

Noury, J. Variation of the speed of ultrasonics in ethane near the critical region, 7524. *See also* Lacam, A., 3041, 4773, 7523, 7642

Novakov, S. *See* Milutinović, V., 4629

Novakov, T. A method for the measuring of low energy β-ray spectra, 4138

Novey, T. B. Experimental energy and angular distributions of inner bremsstrahlung, 2666. *See also* Albers-Schönberg, H., 5032, 7103

Novobatzky, K. F. On the Schrödinger–Gordon equation, 3887

Novoselova, A. V., Simanov, Yu. P. and Yarembash, E. I. Thermal and X-ray analysis of the system LiF-BeF_2, 6318

Novosil'tsev, N. S. *See also* Belyaev, I. N., 4788, 5778

Novosil'tsev, N. S., Khodakov, A. L. and Shul'man, M. S. Metastable states of $BaTiO_3$, 5454*. The influence of departures from stoichiometric composition on the properties of $BaTiO_3$ ceramic in strong fields, 5457

Novozhilov, Yu. V. On eigen-energy of the electron and radiation corrections, 5294

Novozhilova, M. E. *See* Veshev, A. V., 5791

Nowacki, W. Fourier synthesis of crystals and its application in chemistry, 7319

Nowick, A. S. Anelastic measurements of atomic mobility in substitutional solid solutions, 1160. Internal friction in metals, 3674

Noyes, H. P. and Camnitz, H. G. Interference between Coulomb and nuclear scattering in *p-p* collisions at 240 MeV, 1905

Noyes, W. A., Jr. *See* Groh, H. J., Jr, 2367

Nucci, P. A calculating rule with special scales for the solution of right-angled vector triangles, 8178

Nuckolls, R. G. *See also* Rueger, L. J., 728

Nuckolls, R. G., Rueger, L. J. and Lyons, H. Micro-wave absorption spectrum of ND_3, 3135

Nudelman, S. *See* Matossi, F., 3176

Nudenberg, W. *See* Kharasch, M. S., 513

Nukasawa, K. On the exchange terms in the HLSP theory of an *n*-electron molecule, 1817. On the contribution of the mutual perturbation of the localized molecular orbitals to the charge distribution, 8623

Numata, T., Matukura, Y. and Okazaki, A. The relaxation phenomena of the selenium rectifier, 228

Nuovo, M. *See* Bordoni, P. G., 8285

Nurse, T. J. *See* Vernon, W. H. J., 4456

Nussbaum, R. H. and Van Lieshout, R. Upper limit for a second beta-transition in ^{114}In and the position of the first excited state in ^{114}Sn, 7882

Nussbaum, R. H., Wapstra, A. H. and Verster, N. F. Decay of ^{67}Cu and the nuclear levels in ^{67}Zn, 7865

Nussbaum, R. H., Wapstra, A. H., Verster, N. F. and Cerfontain, H. On the radioactive decay of ^{112}Pd and ^{112}Ag, 7071

Nutting, J. *See* Cosslett, V. E. [Conf. rep.], 3351

Nyborg, W. L. Acoustic streaming due to attenuated plane waves, 2271

Nyborg, W. L., Woodbridge, C. L. and Schilling, H. K. Characteristics of jet-edge-resonator whistles, 2281

Nye, H. A. The diamagnetism of an enclosed electron gas, 4199

Nye, J. F. The flow law of ice from measurements in glacier tunnels, laboratory experiments and the Jungfraufirn borehole experiment, 8808

Oakley, D. C. *See* Walker, R. L., 5102

Oberdorfer, G. Towards the definition of several magnetic quantities, 5561

Oberly, J. J. Harmonic synchronous rectification in double-beam photometry, 3083. *See also* Burstein, E., 2462

Obetz, S. W. *See* Peck, E. R., 5980

O'Brien, J. P., Belli, J. A., Wood, D. E. and Saunders, J. W., Jr. A new technique for the study of the effects of X-radiation on mammalian skin maintained at different temperatures during exposure, 8824

O'Callaghan, T. Calculation of torsional vibrations by the theory of effective masses, 1442. The arithmetical calculation of effective mass, resonant frequency, torsional moments and deformation of rotational vibrating systems, 1443. Arithmetic determination of the amplitude of forced vibrations by means of the effective mass method, 5331. The graphic determination of effective masses and resonant frequencies in torsional vibrating systems, 5332. The effect of minor system changes on the resonance frequencies of torsional vibrating systems, 5333. The correction of approximate derived resonance frequencies by means of the J_{eff}-value, 5334. Algebraic applications of the e.m.-method, 5335. Nomographic solution for three-mass systems, 7514. Effective masses in plants with in-line- or block-motors, 7515. Torsional vibrations of systems with continuous mass and stiffness-distribution, 7516. An electrical resistance analogy of torsionally vibrating systems, 7517

Ochenfeld, R. Antiferromagnetism, 6131

Ochert, N. and Steckelmacher, W. Leak detection practice, with particular reference to the hydrogen palladium method, 6540

Ochs, S. A., Coté, R. E. and Kusch, P. On the radiofrequency spectrum of the components of a sodium chloride beam. The dimerization of the alkali halides, 3490

Oda, N. *See* Shôno, N., 2949

Oda, T. *See* Kondo, S., 182

Odake, T. *See* Kamiyoshi, K-I., 7652

Odell, N. H. *See* Taylor, W. E., 845

Odengrim, K. *See* Svensson, H., 1487

Odgers, G. J. Note on the theory of the Stark effect in stellar spectra, 4573

O'Dwyer, J. J. Bound electronic states in solids, resulting from a "potential hill," 2446

O'Dwyer, J. J. and Sack, R. A. The frequency dependence of the dielectric properties of dipolar substances, 1608

Oel, H. and Strehlow, H. Charge-free electrodes in electrochemistry, 2014

Oesinghaus, W. Recording instruments with inkl recording, 593

Oesterlin, W. Instrument for recording of ripples water level, 3912

Oetjen, R. A. *See* Hansler, R. L., 7578

Oettinger, A. G. Programming a digital computer learn, 1332

Offenbacher, E. L. and Callen, H. B. Directio effects in the electric breakdown of ionic crysta 4824

Ogata, K. and Matsuda, H. Masses of light atom 1857. Atomic mass of P^{31}, 3536

Ogawa, S. On the cosmic-ray bursts underground: interaction of π-meson with nucleon, 8489. *See a* Kojima, S., 6138, 8621; Komori, H., 469

Ogawa, S. and Matsuzaki, Y. Study on the sup lattices of ternary alloys by X-ray, 4485

Ogg, R. A., Jr. *See* Cowan, G. R., 8732

Ogi, M. *See* Soma, J., 1800, 8610

Ogle, K. N. *See* Jacobs, M., 2872

Ogle, W. E. *See* England, R. D., 4161

Oguchi, T. Statistical theory of rotational ph transition. II, 7812

Ohno, K. *See* Itoh, T., 1815; Nakamura, T., 8618

Ohtsuka, T. *See* Waniek, R. W., 3579, 5087

Okada, J. and Ikegawa, T. Electrical resistivity artificial graphite, 842

Okada, T. *See* Hirakawa, K., 207

Okamura, T., Fujimura, T. and Date, M. Dielec constant and permeability of various ferrites in microwave region, 4079

Okamura, T. and Kojima, Y. Magnetic resonance $LaMnO_3$ at low temperature, 6940

Okamura, T., Kojima, Y. and Torizuka, Y. Fe magnetic resonance in various ferrites at low high temperatures, 4212. Ferromagnetic resona in the single crystals of some ferrites. I, 4214

Okamura, T. and Simoizaka, J. On the magn transition of nickel-ferrite at low temperature, 42

Okamura, T. and Torizuka, Y. Microwave resona absorption in magnetite at low temperature, 4 Ferromagnetic resonance absorption in NiOFe and a new magnetic transition at low temperat 4210

Okamura, T., Torizuka, Y. and Date, M. P magnetic resonance in copper acetate at 47 Mc/sec, 2547

Okamura, T., Torizuka, Y. and Kojima, Y. Th factor of ferrite, 1747. Magnetic resonance abs tion in antiferromagnetic materials, 4207

Okaya, Y. and Nitta, I. On an application of inequa methods to centrosymmetric crystals with pa known structures, 543. Application of our lin inequalities and some remarks on B. S. Magd paper on "Forbidden reflection in the Harker–Ka inequalities," 544

Okayama, T. Generalization of statistics, 2962

Okazaki, A. *See* Adair, R. K., 4392; Matukura, 852; Matumura, O., 69; Numata, T., 228; Walt, 4366

Oke, J. B. and Schwarzschild, M. Inhomogene stellar models. I. Models with a convective and a discontinuity in the chemical composition,

O'Kelley, G. D. *See* Batzel, R. E., 7923

Okress, E. C. The physics of microwave calorime 4936

Oksengorn, B. *See* Coulon, R., 5386, 6622, 6637,

Okun', L. B. On the theory of pair formation in collision of heavy particles, 8670

Okuno, T. *See* Ishiguro, M., 841

Olbert, S. *See* Annis, M., 4884, 8483

Oldekop, W. On the capacitance of the selen rectifier, 4809

Oldenberg, O. Excitation of sunlit aurorae, 2 Active nitrogen, airglow, 6334

Oldroyd, J. G. The elastic and viscous properti emulsions and suspensions, 7255

Oliver, A. R. *See* Blau, M., 7910

Oliver, D. J. and Sucksmith, W. The spontan magnetization of alloys. I. Copper nickel al 6960. *See also* Sucksmith, W., 8578

Oliver, D. R. and Ward, S. G. Relationship bet relative viscosity and volume concentration of s suspensions of spherical particles, 3693

ver, G. D. and Grisard, J. W. Metal ebulliometers for vapor pressure measurement, 3239
ver, N. J. *See also* Chamberlain, J. W., 6333
ver, N. J., Wolnik, S. J., Scanlon, J. C. and Chamberlain, J. W. Some remarks on spectra of low-intensity auroras, 8818
owsky, J. *See* de Laboulaye, H., 8689
oane, J. K. Some absorption bands in the far infrared, 4000
en, H. L. *See also* Edmondson, R. B., 1565
en, H. L., Edmondson, R. B. and Gayhart, E. L. Microchronometric schlieren study of gaseous expansion from an electric spark, 186
en, J. *See* Arley, N., 4492
en, J. L. *See also* Cornish, F. H. J., 7687
en, J. L. and Renton, C. A. Heat conductivity of superconductive lead below 1°K, 1647
en, J. L. and Rosenberg, H. M. The thermal conductivity of metals at low temperatures, 4758
en, K. M. *See* Pfann, W. G., 2809
on, E. L. *See* Handley, T. H., 5679
ar, M. *See* Tolansky, S., 1401, 8047
Meara, F. E. An enhanced reactor, 3610
eda, S. Note on the theory of *V*-particles and τ-mesons, 464. *V*-particles and nuclear phenomena, 467
Neill, T. *See* Parr, W., 4534
g Ping Hok. *See* Stoker, P. H., 5044, 7087–8
shi, T. *See* Kikuchi, M., 3310
o, K. *See* Hayashi, I., 8567
o, S. Statistical mechanics of phase transition, 3240
o, Y. On the energy-momentum tensor of Bopp-type non-local fields, 27
sager, L. Interpretation of the de Haas–van Alphen effect, 1753
uma, S. *See* Machida, S., 50; Taketani, M., 48–9
kawa, A. Notes on the crystallite theory of liquid, 1420. *See also* Fukushima, E., 8711–12
rt, J. Inferences on the origin of comets derivable from the distribution of the reciprocal major axes, 6401*
rt, J. F. H. Problems of galactic structure, 3822
rt, J. F. H. and Muller, C. A. Spiral structure and interstellar radio emission, 3824
echowski, W. Magneto-optical effects and paramagnetic resonance, 8597
fer, G. *See* v. Borries, B., 4844
tz, W. On the condensation of metallic vapours on hot surfaces, 6711
ler, A., Meikle, R. W. and Charlesworth, M. J. Automatic calculation of color differences, 6682
ler, A. and Miller, J. H. Applications of a modified spectrophotometer for microspectrometry, microdensitometry, and continuous flame photometry, 110
penheim, I. *See* Zwanzig, R. W., 6741
penheim, U. *See* Many, A., 2899
, L. d'. *See* d'Or, L.
chin, M. *See* Friedel, R. A., 7565
ding, J. R. and Redding, V. L. Sound waves observed in mud-filled well after surface dynamite charges, 5931
e, A. Ortho-parapositronium conversion, 4292. Stability of simple positron compounds, 4293. *See also* Frönsdal, C., 8236
gel, L. E. *See* Dunitz, J. D., 2835
kin-Lecourtois, A. *See* Crussard, J., 5560, 7173
mont, B. F. *See* Smirnova, V. I., 5323
nstein, L. and Pollister, A. W. Schwarzschild–Villiger effect in microspectrophotometry, 113
Rourke, R. C. Multiple Compton scattering of low energy gamma-radiation, 3565. Deviations from Brillouin's free-spin theory in manganese fluosilicate, 6309. Absorption of light by trapped electrons, 7296
r, S. F. D. The design of a ratio-recording spectrophotometer with double-pass monochromator, 7553
soni, L. *See* Gallone, S., 2729
tiz Muñiz, E. Computation of the moment of inertia of various bodies by the approximate sum of numerical series, 2213
tusi, M. The analogy between certain aspects of tropospheric propagation and particle trajectories in wave mechanics, 5590
zechowski, A. *See* d'Or, L., 508
zechowski, L. *See* d'Or, L., 507
Osada, K. Ultraviolet absorption spectra of glasses containing Ti, and heavy metals, 4009
Osborne, D. W. *See* Abraham, B. M., 3252; Weinstock, B., 2415; Westrum, E. F., Jr, 3273
Osborne, F. J. Fitz. *See* Fitz Osborne, F. J.
Osborne, L. S. *See* Goldschmidt-Clermont, Y., 2712
Osborne, M. F. M. Number theory and the magnetic properties of an electron gas, 949
Osborne, R. N. *See* Lindner, M., 1871, 7125
Osmond, W. P. An interpretation of the magnetic properties of some iron-oxide powders. II, 4906
Ostapkovich, P. L. *See* Robinson, S. A., 1240
Oster, G. and Mark, H. The production of organic free radicals by light, 4448
Osterberg, H. The measurement of unresolved opaque particles by means of variable phase microscopy, 3224. *See also* Bennett, A. H., 789
Osterbrock, D. E. The time of relaxation for stars in a fluctuating density field, 2159*
Ostroumov, G. A. A rapid procedure for working out the results of measurements obtained by the hyperbolic tangent method, 1621
Ostyakov, M. *See* Takibaev, Zh., 5558
Oswald, W. A method for shortening the experimental time of a thermal conductivity determination by the Poensgen plate method, 6701
Oswin, H. G. *See* Lane, M. R., 4439
Otero, J.-M., Yunta, J. and Solis, M. The independence of threshold measurements of form. The stimulus area as dominant factor, 1310
Otpushchennikov, N. F. The velocity of ultrasonic waves in metals, 1448. On the method of the determination of the absorption of ultrasonic waves in metals, 5918
Ott, H. On the energy-momentum tensor of Maxwell–Minkowski electrodynamics, 1377
Ott, H. F. *See* Dawson, G. H., 723
Otterson, D. *See* Hacskaylo, M., 3727
Ouellet, C. *See* Léger, E. G., 8009
Ovechkin, G. V. New kind of luminescence in fused quartz and Plexiglass, 772
Overbeek, J. T. G. *See also* de Groot, S. R., 1651
Overbeek, J. T. G. and Mazur, P. The thermomechanics of transport phenomena, 4643
Overbeek, J. T. G. and Sparnaay, M. J. Experiments on long-range attractive forces between macroscopic objects, 3481
Overhauser, A. W. Paramagnetic relaxation in metals, 2550. Isothermal annealing effects in irradiated copper, 5608
Owen, G. E. *See* Chagnon, P. R., 8707
Owen, J. *See also* Griffiths, J. H. E., 2614
Owen, J. and Stevens, K. W. H. Paramagnetic resonance and covalent bonding, 6952
Owen, M. E. *See* Davenport, P. A., 3588
Owston, P. G. *See* Mason, B. J., 531
Oxholm, M. L. *See* Shaw, J. H., 3812
Oxley, C. L., Cartwright, W. F., Rouvina, J., Baskir, E., Klein, D., Ring, J. and Skillman, W. Double scattering of high-energy protons by hydrogen and carbon, 7730
Ôyama, T. and Tanaka, S. On the emulsification of the flotation reagents by means of ultrasonic waves, 3957
Oyarzabal, J. de. *See* de Oyarzabal, J.

Pace, E. L., Heric, E. L. and Dennis, K. S. Some thermodynamic properties of methane adsorbed on rutile between 80 and 140°K, 6737
Pack, D. C. A note on the unsteady motion of a compressible fluid, 8184
Pack, D. C. and Roberts, L. Flow of inviscid supersonic jet past an infinite wedge, 7509
Packard, R. G. Streaming potentials across glass capillaries for sinusoidal pressure, 2470
Packham, R. C. G. *See* Fox, L. L., 8380
Paehler, J. H. *See* Fowler, J. L., 435
Paetzold, K. H. and Krömer, H. On the temperature dependence of electron levels in crystals, 5952
Paganelli, M. and Quareni, G. On the disintegration scheme of K^{40}, 1866
Page, C. H. Discussion of units and dimensions in physics, 15
Page, D. I. *See* Astbury, J. P., 1931, 4384, 5718; Millar, D. D., 8487

Page, L. A., Stehle, P. and Gunst, S. B. Direct comparison of *m/e* for the positron and the electron, 4070
Page, R. S. and Garfitt, R. G. An electron diffraction instrument, 1679
Page, T. Radial velocities and masses of double galaxies, 2156
Page, T. L. The B-spectrograph of the McDonald Observatory and its use for cometary spectra, 6408
Pahl, M. *See* Hiby, J. W., 80–2
Pai, S. I. Axially symmetrical jet mixing of a compressible fluid, 644
Pain, C., Duval, C. and Lecomte, J. Study, by means of a thermobalance and the infrared absorption spectrum, of calcium sulphate anhydrate, hydrated and deuterated, 7567
Pais, A. *See* Van Hove, L., 1934
Pake, G. E. *See* Townsend, J., 2548
Pakswer, S. and Meyer, R. Arc drop and deionization time in inert gas thyratrons, 6872
Palmatier, E. D. The electronic component at low altitudes produced by π-meson decay, 941
Palmer, G. H. and Aitken, K. L. A mass spectrometer ion source for solid material, 8465. *See also* Aitken, K. L., 1130
Palmer, L. S., Cunliffe, A. and Hough, J. M. Dielectric constant of water films, 1607
Palmer, P. L. *See* Fox, L. L., 8380
Palmer, R. B. J. A thermoelectric method of comparing intensities of ultrasonic fields in liquids, 6559
Pan Chi Yuan. *See* Chi Yuan Pan.
Panasyuk, E. I. *See* Konstantinova-Shlezinger, M. A., 5402
Pancholy, M. *See* Parthasarathy, S., 2440, 8279
Pancini, E. *See* Quaranta, A. A., 7949
Panesenkov, F. F. Magnetization of toroids with one and two cuts, 1766
Paneth, F. A. Meteorites and cosmic rays. Comment, 1340. Chemical exploration of the stratosphere, 2841
Paneth, F. A., Reasbeck, P. and Mayne, K. I. Production by cosmic rays of helium-3 in meteorites, 8510
Pant, L. M. *See* Saksena, B. D., 7596
Pantchechnikoff, J. I., Lasof, S., Kurshan, J. and Moore, A. R. Use of the flying-spot scanner to study photosensitive surfaces, 862
Papapetrou, A. A rotationally symmetric solution in the general theory of relativity, 8206
Papas, C. H. and Salisbury, W. W. A new type of propagation, 2561
Pape, R. *See* Bornschein, H., 8143
Papineau, L. *See* Berthelot, A., 7089
Paquot, C. and Perron, R. New apparatus for the determination of points of fusion and solidification, 5999
Paranjape, B. V. On the theory of internal friction in metals, 7227
Parasol, M. *See* Rundle, R. E., 1010
Parfenov, V. V. and Abel's, V. R. Investigation on the temperature dependence of the Hall effect in electrolytic iron, 5600
Parfitt, G. G. A note on the measurement of damping in vibrating rods, 1997
Pargamanik, L. É. *See* Lyubarskiĭ, G. Ya., 5543
Pariser, R. An improvement in the π-electron approximation in LCAO MO theory, 4261
Pariser, R. and Parr, R. G. A semi-empirical theory of the electronic spectra and electronic structure of complex unsaturated molecules. I, 3508; II, 5636
Parker, E. N. Gravitational instability of a turbulent medium, 1336. The interstellar structures. I. Gas clouds, 3798. Extensions of Heisenberg's model of turbulence to critical Reynolds numbers, 3907. Acoustical radiation from the velocity field in a compressible fluid, 3951. The effect of turbulence on heat transfer in a pile with a liquid reactant, 4375. Instability of thermal fields, 8192
Parker, J. G., Adams, C. E. and Stavseth, R. M. Absorption of sound in argon, nitrogen, and oxygen at low pressures, 3046
Parker, K. *See* Elton, L. R. B., 6846
Parker, L. W. and Holmes, J. R. Isotope shift in neutral oxygen, 2333. New fine structure in neutral oxygen, 4294
Parkin, P. H. American and European standa
methods for measurement of sound transmission
buildings, 92
Parkin, P. H., Allen, W. A., Purkis, H. J. a
Scholes, W. E. The acoustics of the Royal Festi
Hall, London, 3074
Parkinson, W. C. *See* King, J. S., 376, 3595
Parkinson, W. D. and Hess, V. F. A new method
using ionization chambers, 277
Parlin, R. B. *See* Wilde, K. A., 8755
Parmenter, R. H. The acousto-electric effect, 3066
Parr, R. G. A method for estimating electronic repulsi
integrals over LCAO MO's in complex unsatura
molecules, 359. *See also* Pariser, R., 3508, 5636
Parr, W., O'Neill, T. and Krebs, A. A study of
X-irradiation protection afforded by cobalt, 4534
Parrish, M., Jr. *See* Blout, E. R., 1493
Parry, G. *See* Martin, D. G. E., 4325, 4329
Parry, J. K., Rathgeber, H. D. and Rouse, J.
Ionization of cosmic ray mesons in argon, 6912
Parry-Jones, R. *See* Bockris, J.O'M., 8016
Parsons, K. A. Photoelastic studies of quench
cylinders and spheres, 4424
Parsons, R. *See* Bockris, J. O'M., 4446
Parthasarathy, S. and Bakhshi, N. N. Relat
between velocity of sound and viscosity in liqui
6557
Parthasarathy, S., Chari, S. S. and Mahendroe, P.
Determination of ultrasonic absorption coeffici
in liquids by a new technique, 6558. Calorime
determination of the coefficient of absorption
sound in organic liquids, 7528
Parthasarathy, S., Chari, S. S. and Srinivasan,
Ultrasonic absorption on various organic liqu
at 15 Mc/s, 1454. Determination of ultraso
absorption in liquids at 5 Mc/s from therr
considerations, 2269. The dependence of inten
of sound at source on its absorption coefficient
liquids, 3045. Equivalence of sonic and ther
energies, 3948. Thermal effect of ultrasonic wa
at frequencies of 3 Mc/s and above, 5920.
relationship between the intensity of sound at
sound radiator and the absorption coefficients
liquids, 5921. Equivalence of sonic and ther
energies, 7529. Absorption of ultrasonic waves
liquids at 5 MHz from thermal considerations, 82
Thermal investigation on the absorption of ul
sonics in liquids, 8291. The relation of the tempe
ture effects of ultrasonics in liquids to their absorpt
coefficients, 8292
Parthasarathy, S. and Chhapgar, A. F. Damping
an oscillating quartz in liquids and its relation
viscosity, 7533. Viscosity as a factor in the anon
ous absorption of ultrasonic waves in liquids, 8
Parthasarathy, S., Chhapgar, A. F. and Singh,
Dispersion of ultrasonic waves in esters, 39
Dispersion of ultrasonic velocity in some orga
liquids, 8283
Parthasarathy, S., Pancholy, M. and Chhapg
A. F. Piezoelectric oscillations of quartz plate
even and half-odd harmonics, 2440. The pie
electric oscillations of a quartz crystal at its o
even and half-odd harmonics, 8279
Partington, J. R. Advances in thermodynamics,
An advanced treatise on physical chemis
Volume 3. The properties of solids, 5148
Paruntseva, R. Creation of π^+-mesons in the collis
of protons, 3614
Parzen, G. Electronic energy bands in metals, 2060
Pasheva, Z. P. and Tarkhova, T. N. The cry
structure of milarite, 8797
Pashley, D. W. The decomposition of thin orien
silver halide layers, 1966
Passerini, R. and Ross, I. G. An apparatus for
ultra-violet spectroscopy of solutions at low t
peratures, 6606
Passman, S. *See also* Block, M. M., 1908
Passman, S., Block, M. M. and Havens, W. W.,
Excitation function for charged π-meson produc
in hydrogen and carbon by 345- to 380-MeV prot
1909
Pastor, R. C. *See* Hutchison, C. A., Jr, 8563
Pastori, M. On the equations of the electromag
field in Einstein's most recent theory, 1356

man, J. E. The application of sampling methods to analogue integrators, 8179

man, L. W. and Peiser, H. S. An X-ray diffraction study of the transformation of retained austenite by fracture, 5730

ick, F. B. *See* Yoder, P. R., Jr, 7543

e, H. H., Jr. The scanning X-ray microscope, 2476

erson, A., Jr. The high field conductance of some symmetrical valence-type strong electrolytes, 5753

erson, A. L. An orthogonal unit vector triplet associated with a general lattice, 7311

erson, W., Jr. *See* Bergen, J. T., 5877

on, R. G. and Hatfield, P. Ultrasonic techniques in the rubber industry, 3065

, E. B. and Clarke, R. L. Cross-section measurements of reactions induced by neutrons of $14\cdot5$ MeV energy, 2723

, W. An oximeter for continuous absolute estimation of oxygen saturation, 5264

, W. and Jones, R. V. Production and separation of small glass spheres, 479. Absorption spectra of lead sulphide at different temperatures, 3130

ing, L. A theory of ferromagnetism, 8519. *See also* Corey, R. B., 8630; Marsh, R. E., 8093

y, J. Enclosure of sodium during crystallization of potassium nitrate with radioactive sodium as indicator, 2042

ncz, R. and Berencz, F. The diamagnetic anisotropy of four-ring condensed aromatic hydrocarbons, 1754

henet, R. Spontaneous magnetization of ferrites, 958

henier, M. and Challande, R. Electron microscope study of electrically precipitated deposits, 1973. Precipitation of radioactive particles in an intensely ionized electric field, 3640

henier, M. and Cochet, R. Development of a charged water droplet in a cloud above freezing level, 7365

ović, B. *See* Vukanović, V., 4630

on, H. W. The initial yield in iron, 2769

ne, B. O. Phase-contrast equipment for use with the Cooke ultra-violet microscope, 3210. A re-imaging attachment for use in phase-contrast microscopy, 3211

ne, D. A method for the determination of the approximate surface areas of particulate solids, 8247

ot, R. and Jaquerod, A. Distribution of radioactivity in Switzerland, 5667

e, A. G. and Pringle, G. E. Some properties of lines on divergent-beam X-ray photographs, 2075

h, M. O. Mechanism of growth of whiskers on cadmium, 2045. Remarks concerning the paper "Conditions for the derivation of the stress deviator tensor," 2768

e, H. J. and Davy, N. The magnetic fields produced by uniformly magnetized ellipsoids of revolution, 6935

ce, C. A. R. An electromagnetic torquemeter for use in viscometry, 7483

ce, R. M. and Mann, K. C. Compton electron suppression in the gamma-ray spectra of Ra(B + C), Co^{60}, and Ta^{182}, 5048

lman, N. *See also* Keesom, P. H., 816, 1801

lman, N. and Keesom, P. H. The atomic heat of silicon below 100°K, 817

se, J. F. *See* Hamann, S. D., 4660

son, D. E. *See* Josien, M.-L., 1808

son, G. L. and Tanenbaum, M. The magnetoresistance effect in InSb, 4816

son, J. *See also* Rinehart, J. S., 4431

son, J. and Rinehart, J. S. Surface motion associated with obliquely incident elastic waves, 3030

son, W. B. *See* Hume-Rothery, W., 482; MacDonald, D. K. C., 217, 7690

e, L. *See* Katz, L., 7137

e, R. L. and Feshbach, H. The theory of hydrogen three, 1029

lee, D. C. β-matrix formalism as $\kappa \to 0$, 33. Photon-induced reactions, 1126. The Fermi term in β-ν correlation, 4315. *See also* Boehm, F., 6202; King, R. W., 6175

enkina, R. S. *See* Florinskaya, V. A., 6645

, D. S. Cold cathode counting tube, 5540

Peck, E. R. and Obetz, S. W. Wavelength or length measurement by reversible fringe counting, 5980

Peck, G. T. *See* Chesterman, W. D., 2888

Pecker, C. Connection between radiative and adiabetic zones: case of an atmosphere composed of H and He, 4576. The condition of continuity of flux, 5284. Study of the gravity-flux diagram, 5285

Pecker, J.-C. and van Regemorter, H. Measurement of the equivalent width of a spectral line—the influence of resolving power, 4565

Peelle, R. W. *See* Standing, K. G., 4162

Peierls, R. E. The atomic nucleus and its constituents, 5654

Peiser, H. S. *See* Pateman, L. W., 5730

Peistrup, C. F. and Wesler, J. E. Noise of ventilating fans, 3070

Pekar, S. I. Theory of luminescence and optical absorption by admixtures in dielectrics, 747. Polaron theory, 1630. Criticism, partial foundation and limits of application of the zonal theory of electrons in crystals, 2058. *See also* Dÿkman, I. M., 5779

Peker, L. K., Sliv, L. A. and Zolotavin, A. V. The analysis of nuclear excited states [for $20 < Z < 70$] by means of the shell model, 7832

Pekeris, C. L. A classical model of a roton, 8373

Pell, E. M. Recombination rate in germanium by observation of pulsed reverse characteristic, 4091

Pell, E. M. and Sproull, R. L. Sensitive recording alternating-current Hall effect apparatus, 340

Pellam, J. R. *See* de Klerk, D., 2421, 3251; Weinstock, B., 3261

Pellas, P. The mechanism of diffusion of helium in zircons, 1426

Pellé, M. *See* Labeyrie, J., 7742; Raïevski, V., 8709

Pendergrass, E. P. *See* Ritter, V. W., 573

Penfold, B. R. The electron distribution in crystalline α-pyridone, 8114

Penneman, R. A. *See* Jones, L. H., 3149; Stephanou, S. E., 1522

Penner, S. S. Quantitative studies of apparent rotational temperatures of OH in emission and absorption (spectral lines with Doppler contour), 1490. Effect of spectral line shape on apparent rotational temperatures of OH, 3985. Determination of absolute F values from relative intensity measurements for spectral lines with Doppler contour, 3987. *See also* Holm, R. J., 722; Kavanagh, R. W., 4680–1; Weber, D., 762

Penner, S. S. and Kavanagh, R. W. Radiation from isolated spectral lines with combined Doppler and Lorentz broadening, 4706

Penner, S. S. and Weber, D. Infrared intensity measurements on nitric oxide, hydrogen chloride, and hydrogen bromide, 3999

Pepinsky, R. Some aspects of neutron single crystal analysis, 3755. *See also* Frazer, B. C., 6756; Shirane, G., 7656

Pepinsky, R. and Jarmotz, P. R–PAC: Analog recorder-playback computer for crystal analysis, 7315

Pepper, T. P. *See* Almqvist, E., 8674

Perakis, N. Paramagnetic diffusion effect of sulphur ions in silver bromide at high temperatures, 6943. *See also* Wucher, J., 322

Perakis, N. and Wucher, J. The characteristic thermomagnetic curve for vanadium tetroxide between 81° and 680°K, 321

Péraldi, R. Observations of some phenomena of surface expansion in the Devaux mercury trough, 8261

Perceau, R. A magnetochemical study of amino-acids, 3704

Pereira, A. W. *See* Rao, A. S., 7777

Perekalina, T. M. Investigation of ferromagnetic resonance in Cr-Te alloys [50 mol. % Te], 5566

Peretti, J. *See* Lacaze, A., 7639

Peretts, V. B. *See* Bulanova, A. I., 6147

Perey, M. and Adloff, J.-P. Chromotographic separation of francium, 5190. Separation of AcB from AcC'' by paper chromatography, 7270

Pérez, J. P. and Johannin, P. Piezoelectric resonance of quartz up to 5000 atm., 835

Perez-Mendez, V. *See* Boehm, F., 6202; Wu, C. S., 412

Perez Rodriguez, M. *See* Bru, L., 1825

Peri, G. *See* Blanc-Lapierre, A., 6685

Perio, P. Crystalline forms of UO_3, 7324

Perkampus, H.-H. Calculation of light absorption of acenes with the aid of the spreading electron-gas model of H. Kuhn, 3118
Perkins, W. D. and Wilson, M. K. The infrared spectrum of SO_2F_2, 745
Perkinson, J. D., Jr. *See* Bruner, H. D., 1044
Perl, W. Relativistic contributions to the magnetic moment of *n*-electron atoms, 7848
Perl, W. and Hughes, V. Nonradiative relativistic contribution to the magnetic moment of $^3S_1$ helium, 3532. Relativistic contributions to the magnetic moment of $^3S_1$ helium, 7847
Perlat, A. Note on the relation between the meteorological situation and the location of sferics, 1299
Perlee, H. E. *See* Kerker, M. 1561
Perlman, I. *See* Asaro, F., 400, 1063, 8654*; Hollander, J. M., 7061
Perlman, M., Bigeleisen, J. and Elliott, N. Equilibrium in the exchange of deuterium between ammonia and hydrogen, 1999
Perlman, M. L. *See also* Schwartz, R. B., 7873
Perlman, M. L. and Miskel, J. A. Average charge on the daughter atoms produced in the decay of A^{37} and Xe^{131m}, 7861
Perlman, M. M. and Bloom, M. A nuclear resonance modulation correction, 1844
Perlmutter, A. *See* Kallman, H., 2380
Perlow, G. J., Davis, L. R., Kissinger, C. W. and Shipman, J. D., Jr. Rocket determination of the ionization spectrum of charged cosmic rays at $\lambda = 41°N$, 303
Pernoux, E. Electronic fringes possessing a centre of symmetry, 898. *See also* Bernard, R., 2486, 3355, 5132
Perrelle, E. T. de la. *See* de la Perrelle, E. T.
Perrin, N. Scintillation spectrometer study of the radiations from Zn^{65}, 7070
Perron, R. *See* Paquot, C., 5999
Perrot, M. *See also* Blanc-Lapierre, A., 5378, 6685
Perrot, M. and David, J.-P. Deviations from Ohm's law for very thin metallic films, 6764
Perry, C. L. *See* Rose, M. E., 5023
Perry, J. P. *See* Angell, C. E. 6235
Perry, K. E. *See* Brownell, G. L., 8820
Perry, W. E. Standardization of radioactive isotopes by coincidence and γ-ray ionization, 3540
Persano, A. *See* Gatti, E., 7963
Person, W. B. and Pimentel, G. C. Infrared studies of mixed crystals: naphthalene-d_8 in naphthalene, 1518
Persson, R. *See* Hellstrand, E., 2717; v. Dardel, G., 1949
Perucca, E. Fundamental metrological work today in thermology and photometry, 8383
Perucca, E. and Demichelis, F. Extent of the international system of measurement, 8200
Pesteil, P. Polarization of fluorescence of diphenyl and of tetraphenyl-1144-butadiene, 2365. *See also* Barbaron, M., 6658
Petch, H. E., Volkoff, G. M. and Cranna, N. G. Second-order effects in nuclear electric quadrupole interaction of Al^{27} in spodumene, 1845. Second order nuclear quadrupole effects in single crystals. II. Experimental results for spodumene, 6948
Peter, M. *See* Jaccard, C., 8387
Peterlin, A. Light scattering by very stiff chain molecules, 3187
Petermann, A. Divergence of perturbation expansion, 3885. Divergence of perturbation theory, 6481. Renormalization in divergent series, 7429
Peters, H. *See* Hauffe, K., 6035
Peters, J. and Stroke, G. Electronic location of interference fringes, 7606
Peterson, A. M. *See* Manning, L. A., 6390; Villard, O. G., Jr, 560–1
Peterson, G. E. The information-bearing elements of speech, 711
Peterson, S. W. *See* Levy, H. A., 3756; Waser, J., 8101
Peterson, V. *See* Aamodt, R. L., 1107
Peterson, V. Z. *See* Neher, H. V., 4899
Petersson, S. Investigation of stress waves in cylindrical steel bars by means of wire strain gauges, 3933
Petiau, G. On the evaluation of the Coulomb scattering cross-section for the collision of two elementary particles of spins $n\hbar/2$ and $m\hbar/2$ (m, n integral), 2194. On the calculation of the cross-section for emission of bremsstrahlung by a particle of spin $h/2$ in in action with a particle of spin $nh/2$, 4602. On representation by spherical functions of solution the wave equations of particles with spin in cons potentials. Case of particles of spin $\hbar/2$ and $\hbar$, 6 On the calculation of the scattering of particle spin $\hbar/2$ by a pseudoscalar Coulomb potential, 7 On the calculus of effective cross-sections of Coul scattering between particles of spin 0, $\hbar/2$ or $\hbar$, 74
Petit, M. *See* Loiseleur, J., 5761
Petralia, S. Ultrasonic interferometry in gases. Ultrasonic dispersion in methyl chloride, 1 III. Velocity and absorption of ultrasound in sul dioxides, 7527; IV. Absorption of ultrasonic ammonia, 8290
Petralia, S. and Cevolani, M. Propagation of u sonics in systems of partially mixed liquids, 466
Petri, W. Monochromatic fluctuations of the i solar corona, 5840
Petrie, W. and Small, R. The auroral spectrum i wave-length range 3300–8900 Å, 4517
Petschek, A. G. The absorption of slow π^- meson He^4 nuclei, 6237
Petty, C. C. *See* Curcio, J. A., 2851
Peyron, M. *See* Déjardin, G., 121
Peyrou, C. *See* Bridge, H. S., 6122, 7178
Peyturaux, R. Contribution to the study of the tinuous solar spectrum in the near infrared, 4 Centre-to-limb darkening of the sun between 60 and 23 000 Å, 5277. *See also* Mineur, H., 4561
Pfann, W. G. *See also* Vogel, F. L., 5774
Pfann, W. G. and Olsen, K. M. Purification prevention of segregation in single crystals germanium, 2809
Pfefferkorn, G. *See* Westermann, H., 5131, 608
Pfeiffer, F. *See* Assmus, F., 2442
Pfister, H. Influence of absorption on the structu Kikuchi bands and the light-dark structure obse when the source lies within the crystal. [G quelleninterferenz], 899. Electron diffraction in iodide with a convergent beam, 4856
Pfisterer, H. Electron microscope photograph rough surfaces, 6259
Pfotzer, G. A cloud-chamber study of cosmic showers under lead in the neighbourhood o second maximum of the absorption curve, On the contributions of electrons knocked o μ-mesons to the cosmic-ray showers behind va thicknesses of lead, 8492
Pham Man Quan. Thermodynamics of a relati fluid, 7422
Phelps, A. V. and Molnar, J. P. Lifetimes of stable-states of noble gases, 4290
Philipp, H. R. *See* Sparks, I. L., 4180
Philipp, K. *See* Herbst, W., 7362–3
Philippoff, W. Mechanical investigations of el mers in a wide range of frequencies, 6263
Philippot, J. *See* Prigogine, I., 3250, 6722–3, 837
Phillips, C. S. G. *See* James, D. H., 524
Phillips, D. D., Davis, R. W. and Graves, E Inelastic collision cross sections for 14-MeV neut 1133
Phillips, H. B. and Swank, R. K. Measuremen scintillation lifetimes, 8332
Phillips, H. W. L. The nature and properties o anodic film on aluminium and its alloys, 4400
Phillips, J. A. The energy loss of low energy pr in some gases, 4874
Phillips, K. On the polarization of high-e bremsstrahlung, 4141. On the existence of mu resonances in the $^{63}Cu(\gamma, n)^{62}Cu$ reaction, 7927
Phillips, M. Perturbations of atomic g values, 38
Phillips, R. *See* Aamodt, R. L., 1107
Philpot, J. St. L. Some new forms of interfe microscope, 3201
Piatt, D. *See* Ingram, M., 2868
Picard, D. *See* Busnel, R.-G., 2018
Picard, E. and Rogozinski, A. On the localiz of the discharge in G.M. counters, 7737
Picciotto, E. *See* Begemann, F., 1047; Isaac, N., 5
Pick, H. *See* Bayer-Helms, F., 6517; Kern, E., Martienssen, W., 6651; Mette, H., 6770; Mies G., 8778
Pickavance, T. G. *See* Randle, T. C., 7914

els, E. G., Harrington, W. F., and Schachman, H. K. An ultracentrifuge cell for producing boundaries synthetically by a layering technique, 2790
ett, L. W., Muller, N. and Mulliken, R. S. Hyperconjugation in $C_6H_7^+$ and other hydrocarbon ions, 8624
up, E. Grain size in Ilford G5 emulsions, 8159. *See also* Allen, N. L., 3768; Mei, J. Y., 6922
worth, J. and Thompson, H. W. The fundamental vibration-rotation band of deuterium chloride, 6639
s, G. S. The transfer rate of the liquid helium II film near zero level difference, 6010
dington, J. H. Thermal theories of the high-intensity components of solar radio-frequency radiation, 2909
dington, J. H. and Davies, R. D. Origin of the solar corona, 5279
er, G. F. Nuclear energy levels in the region of the 28-neutron shell, 1836
ce, A. K. *See* Aller, L. H., 2150; Mohler, O. C., 3814
ce, E. T. *See* Hepburn, F., 7806
cy, G. R. and Morgan, E. R. Ferromagnetism and order in nickel manganese alloys, 4910
enpol, W. B., Rense, W. A., Walz, F.C., Stacey, D. S. and Jackson, J. M. Lyman–alpha-line photographed in the sun's spectrum, 4567
ri, G. *See* Boutry, G. A., 6871
gott, W. R. The reflection and absorption of radio waves in the ionosphere, 2574. Abnormalities in the ionosphere at high latitudes, 2845
e, K. L. Operational phonemics in reference to linguistic relativity, 710
e, R. G. *See* Van Valkenburg, A., 2804
el'ner, S. B. Kinematic properties of interstellar gas in connection with the isotropic cosmic rays, 6386
ovskiĭ, S. A. *See* Brusin, I. Ya., 5418
low, M. E. Intensities in band-systems of O_2 and O_2^+, 1504. Application of calculated band intensities to the examination of observed spectra, 6411. Band intensities in the CN violet system, 6615. Intensity distribution among bands of the Herzberg system of O_2, 6631
od, P. *See* Laudet, M., 7715
pel, N. Use of extrapolation formulae in dielectric polarization studies, 1606
entel, G. C. *See* Person, W. B., 1518
ionow, L. A contribution to the problem of using ultrasonics for telephone transmission, 3064
cherle, L. *See* Bell, D. G., 4241
egin, N. I., Boldȳrev, N. G. and Barteneva, O. D. Calculation of visibility, 5821
es, B. Ya. Fine-focus X-ray tubes and high-intensity monochromators, 2065. *See also* Bublik, A. I., 2068–9; Geguzin, Ya. E., 7967; Kogan, V. S., 2066, 2754
es, D. *See* Lee, T.-D., 1248, 4475; Low, F. E., 6767
g Hok Ong. *See* Ong Ping Hok.
gel, J. H. *See* Lanzl, L. H., 6216
sent, B. R. W. *See* Everett, D. H., 2781
ta, M. Spectrophotometry of the flame, 5941. Flame spectra of rare earths, 5942
es, L. A. An operational analysis of traffic dynamics, 2893. Matrix solution of equations of the Mathieu–Hill type, 6373
pard, A. B. An experimental and theoretical study of the relation between magnetic field and current in a superconductor, 4106. *See also* Chambers, R. G., 4400
pard, A. B. and Chambers, R. G. The mean free path of conduction electrons in bismuth, 2444
enne, M. H. and Denton, E. J. Accuracy and sensitivity of the human eye, 2114
onneau, Y. The deformation by repeated blows of single crystals of Al–Cu alloy, 3653. Deformation by repeated blows of annealed polycrystalline aluminium, 5141
tius, E. van A. Gey van. *See* Gey van Pittius, E. van A.
ts, E. An extension of the theory of the conductivity and viscosity of electrolyte solutions, 4445
Pitzer, K. S. *See also* Bohn, C. R., 4018
Pitzer, K. S. and Gelles, E. The vibration frequencies of the halogenated methanes and the substitution product rule, 5633
Place, J. A. *See* Sims, R. B., 7994
Plain, G. J. *See* Morrison, H. L., 931
Plaskett, J. S. The theory of the Thomas–Fermi electron density, 3534
Platrier, C. Relations between stresses and deformations in the most general classical medium deformed isothermally, 5140
Platt, J. B. *See* Camac, M., 1020
Platt, J. R. Classification and assignments of ultraviolet spectra of conjugated organic molecules, 4002. *See also* McConnell, H., 2341
Platzman, R. L. On the 'heating' resulting from the absorption of gamma-rays at extremely low temperatures, 7897
Plotkin, H. *See* Bitter, F., 7558
Plumb, R. C. and Hornig, D. F. Evidence for one-dimensional rotation in ammonium iodide, 4253
Pluvinage, P. A theoretical study of the intensity and of the Zeeman effect of the helium intercombination lines, 732
Plyler, E. K. *See also* Acquista, N., 2329; Benedict, W. S., 3113, 7575–6; Gailar, N. M., 2349; Mann, D. E., 7000; Stephens, R. E., 2317
Plyler, E. K. and Acquista, N. Infrared properties of cesium bromide prisms, 2328. Infrared spectrometry with a cesium iodide prism, 3982
Plyler, E. K. and Benedict, W.S. Fine structure in some infrared bands of methylene halides, 2353
Pniewski, J. *See also* Danysż, M., 5716
Pniewski, J. and Danysz, M. Beta-spectrum of radium E, 5686
Po Lee and Weissler, G. L. The characteristics of ultraviolet-sensitized photographic plates in the vacuum ultraviolet, 6359
Pobeguin, T. and Lecomte, J. Study of some mixtures of phosphates and carbonates of calcium, natural or artificial, by means of their infrared absorption spectra, 7268
Pocholle, G. Interpretation of electric current in wave and quantum mechanics, 6804
Podgoretskiĭ, M. I. On the number of spurious impulses, 5535
Podzuweit, G. *See* Hanle, W., 5935
Poeverlein, H. The ionospheric penetration frequency at oblique incidence, 5596
Poganski, S. The barrier mechanism of selenium rectifiers, 6783
Pohl, R. W. *See* Martienssen, W., 2019
Pohlack, H. On the reversibility of light rays in stratified media, 2357. Contribution to the theory of optical interference systems with given spectro-properties, 4739
Pohle, F. V. *See* Dressler, R. F., 6516
Pohlit, W. *See* Lippert, W., 1678
Poiani, G. and Villi, C. The probability of electron localization in extensive showers, 7769. Lateral scattering of showers of low energy, 7772
Poincelot, P. On the non-existence of Sommerfeld's surface wave, 330, 6967. On the propagation of white light in a vacuum, 3451
Poirier, J. C. Thermodynamic functions from Mayer's theory of ionic solutions. I. Equations for thermodynamic functions, 6021; II. The stoichiometric mean ionic molar activity coefficient, 6022
Polachek, H. *See* Ludford, G., 3902
Polanyi, J. C. *See* Gowenlock, B. G., 7262–3
Polder, D. *See also* Meijer, H. J. G., 6766
Polder, D. and Smit, J. Resonance phenomena in ferrites, 8570
Poley, J. P. The effective dielectric constant of solid mixtures, 6750. Note on the dielectric relaxation in glycerine, 6754
Pollack, I. The information of elementary auditory displays, 1312; II, 6341
Pollak, L. W. A condensation nuclei counter with photographic recording, 4501
Pollard, W. G. *See* Brucer, M., 4536
Pollister, A. W. *See* Ornstein, L., 113
Polo, S. R. *See also* Hawkins, J. A., 6623; Wilson, M. K., 744

Polo, S. R. and Wilson, M. K. The infrared spectra of CF_3Br and CF_3I, 2350. The infrared spectrum of CF_3D, 6620
Polovin, R. *See* Akhiezer, A., 8223
Polovin, R. V. *See* Akhiezer, A. I., 6151
Polya, G. On the rôle of symmetrical domains in the calculation of certain physical quantities, 1330
Polynov, V. N. *See* Azimov, S. A., 7757
Pomerance, H. Thermal neutron capture cross sections, 458
Pomeranchuk, I. *See* Akhiezer, A., 5570
Pomeranchuk, I. Ya. Exchange-collisions of fast nucleons with deuterons. II, 617. *See also* Ioffe, B. L., 3567
Pomeranchuk, I. Ya. and Shmushkevich, I. M. Emission of high-energy γ-quanta in the collision of fast neutrons with protons, 8684
Pommier, M.-C. *See* Collet, L.-H., 2013
Pong, W. *See* Ludeke, C. A., 2557
Pontarelli, D. A., Meister, A. G., Cleveland, F. F., Voelz, F. L., Bernstein, R. B. and Sherman, R. H. Substituted methanes. IX. Raman and infrared spectra, assignments, potential constants, and calculated thermodynamic properties for $CHC1BR_2$ and $CDC1BR_2$, 1804
Pool, M. L. Nuclear reactions and radioactivities resulting from 6·7 MeV^{3}H and 21 MeV^{3}He cyclotron bombardments, 5066. *See also* Cheng, L. S., 6200; Hammond, W. R., 4992; Kundu, D. N., 4343, 7911; Mack, R. C., 7875
Poole, D. M. *See* Axon, H. J., 8071
Poole, J. H. J. *See* Delaney, C. F. G., 3545, 7065
Poole, K. M. Electrode contamination in electron optical systems, 7204
Poole, M. J. The inelastic scattering of fast neutrons, 1918
Poots, G. *See* Bates, D. R., 8619
Pope, N. K. The theory of neutron diffraction by gases. I, 7187
Poplawsky, R. P. *See* Symon, K. R., 2137
Pople, J. A. Molecular association in liquids. III. A theory of cohesion in polar liquids, 1424. *See also* Brickstock, A., 1846, 7842–3
Popoff, K. On the phenomenological relations of Onsager, 1419. On the exchange of heat by conduction from one system to another, 5435. On the conduction of heat in a homogeneous bar, 6697
Poppema, O. J., Beun, J. A., Steenland, M. J. and Gorter, C. J. Anisotropic angular distribution of gamma radiation emitted by a source containing aligned ^{60}Co nuclei, 4289
Porfireva, N. N. Calculation of the limiting eigen frequencies of the spectrum of the molecular crystals of para-dibromo-benzene, para-bromochloro-benzene and para-dichloro-benzene, 1005
Poritsky, H. Some industrial applications of conformal mapping, 2891
Porod, G. The thermodynamics of phase changes. I. Heterobaric phase-transitions in one-component systems, 5437
Porreca, F. On the propagation of narrow light beams in liquids traversed by ultrasound, 2388
Porschen, W. *See* Riezler, W., 2653
Porter, C. E. *See* Feshbach, H., 5081
Porter, F. M. *See* Ketelle, B. H., 5003
Porter, F. T. *See also* Cook, C. S., 5064; Primakoff, H.; Whittle, C. E., 4998
Porter, F. T. and Hotz, H. P. An upper limit for atomic orbital electron ejection accompanying K-capture in Fe^{55}, 3556
Porter, G. *See* Christie, M. I., 3482; Khan, M. A., 8022; Norrish, R. G. W., 3246, 8342
Porter, N. A., *See* Keefe, D., 275; McCusker, C. B. A., 4185, 6928
Porter, W. C. Extending the efficient range of G–M counters, 6106
Porter, W. C. and Ramsey, W. E. A circuit for the limitation of discharge in G–M counters, 927
Portis, A. M. *See also* Kip, A. F., 2537*
Portis, A. M., Kip, A. F., Kittel, C. and Brattain, W. H. Electron spin resonance in a silicon semiconductor, 6775
Portnoy, W. M. *See* Swan, J. B., 4306
Posner, A. M. Activity data and the association of hydrogen chloride in concentrated solutions, 4647
Pospelov, V. A. (Conf. rep.]. Conference on the appl cation of X-rays to the study of materials, 4409
Poss, H. L. *See* Falk, C. E., 279; Yuan, L. C. L., 280
Post, B. *See* Glaser, F. W., 6249; Holtzberg, F., 283 Ladell, J., 7327
Post, E. J. On the characteristic temperatures of sing crystals and the dispersion of the "Debye he waves," 2063. Radiation pressure and dispersio 2287. Note on the paper "Radiation pressure ar dispersion," 6571. Momentum and inertia properti of acoustic waves, 6572
Post, H. R. Many-particle systems: derivation of shell model, 8637
Postle, L. J. *See* Gibson, R., 4632
Potter, R. M. *See* Allred, J. C., 1114
Potts, R. B. Spontaneous magnetization of a triangul Ising lattice, 328. Molecular orbital theory alternant hydrocarbons, 5640. *See also* Messel, H 307, 944, 8493
Potts, W. J., Jr. Low temperature spectroscopy in t farther ultraviolet region, 2320
Poulet, H. Application of the macroscopic theory ionic networks to the scattering spectrum of blend 4734
Poulis, N. J. *See also* van den Handel, J., 2538
Poulis, N. J. and Hardeman, G. E. G. The temper ture dependence of the spontaneous magnetizati in an anti-ferromagnetic single crystal, 6939
Poulter, J. *See* Berman, R., 1586
Pound, R. V. *See also* Abragam, A., 5011; Watkin G. D., 2549
Pound, R. V. and Abragam, A. Angular correlatio from liquid sources, 6203
Powell, A. The noise of choked jets, 5360
Powell, C. F. The use of stripped emulsions for cording the tracks of charged particles, 6365
Powell, H. *See* Garrison, W. M., 7119
Powell, J. L. *See* Hall, H. H., 6097
Powell, R. W. The thermal and electrical conducti ties of beryllium, 7621. The electrical resistivity liquid iron, 8396
Power, B. D. *See* Latham, D., 6539
Power, E. A. A new proof of the perturbation expa sions in quantum mechanics, 6482
Powers, M. D. *See* Roe, G. M., 664
Powles, J. G. Dielectric relaxation in d-camphor, 2 An interpretation of the phase transitions in t solid hydrogen halides, 3242. Dielectric relaxati and the internal field, 4075
Powles, J. G., Williams, D. E. and Smyth, C. P. Diel tric dispersion in the microwave region of six tet substituted methanes in the solid state, 1612
Prache, P. *See* Tavernier, P., 812
Präg, R. *See* Gentner, W., 6327
Prager, S. Diffusion in binary systems, 7493
Prager, S. and Eyring, H. Thermal diffusion in bina systems, 7494
Prager, W. A geometrical discussion of the slip li field in plane plastic flow, 5143. *See also* Drucke D. C., 1167
Prandtl, L. The essentials of fluid dynamics, 640
Prast, G., Jr. *See* van Zoonen, D., 3372
Pratt, G. W., Jr. Wave functions and energy levels Cu$^+$ as found by the Slater approximation to t Hartree–Fock equations, 1853
Pratt, P. L. and Pugh, S. F. Twin accommodation zinc, 3709
Pratt, W. W. *See* Jensen, E. N., 4999
Preining, O. Experiments on magnetophotophoresis powdered silver steel, 8606
Preiswerk, P. *See also* Boehm, F., 7129
Preiswerk, P. and Stähelin, P. The first excited sta of even-even nuclei, 5650
Prener, J. S. A magnesium oxide phosphor activat by tetravalent manganese, 3155
Prener, J. S., Hanson, R. E. and Williams, F. Atomic mercury as a luminescent activator, 4736
Prentice, J. P. M. The hourly rate of the Quadran meteor shower at maximum, 5274. *See also* Alcoc G. E. D., 5275
Prentki, J. *See* Jean, M., 5299; Marty, C., 10 7838
Prescott, J. R. The transition effect for cosmic-r bursts at small-thicknesses of lead, 1723

snov, V. A. Problem of the dependence of the high voltage polarization of dielectrics on the electric field strength, 1643
ssey, B. G. *See* Kitchen, F. A., 2575
ssey, D. C. Temperature-stable, capacitance pressure gauges, 2984
ssly, E. C. Air mass between an observer and outer space, 3769
ston, G. *See* Bishop, G. R., 6214
ston, G. W. On the theory of prediction of non-stationary stochastic processes, 2902. The equivalence of optimum transducers and sufficient and most efficient statistics, 6563
ston, M. A. and Duret, M. F. The coupling constant of the nucleon-μ-meson interaction, 1937
ston, W. M. *See* Stelson, P. H., 1921
ston-Thomas, H. The superconductive transition in tantalum, 241. The superconductive transition in lead, 6802
stwood, R. J. *See* Bunker, M. E., 8653
uss, H. Estimation of two-centre integrals, 8615
ce, A. T. and Slichter, L. B. Exceptional cases of electromagnetic interpretation problem, 5228
ce, B. T., West, D., Becker, J., Chanson, P., Nageotte, E. and Treille, P. Further measurements of the ionization by energetic cosmic-ray μ-mesons, 3407
ce, F. V. *See* Davenport, P. A., 3588
ce, P. H. and Slack, M. R. Stability and accuracy of numerical solutions of the heat flow equation, 1572
ce, P. J. The macroscopic theory of superfluid He^3–He^4 mixtures, 4059*
ce, R. E. Travelling disturbances in the ionosphere, 8812
ce, T. *See* Chanson, P., 2530
ce, W. C. *See* Fraser, R. D. B., 126
ce, W. L. *See* Tomlinson, T. B., 8420
ester, W. Photometry of Fraunhofer lines with the Lummer plate applied to (measurement of) the centre–edge variation of the Na-*D* lines, 8193
eto, F. E. Anomalous magnetic moments of nucleons. I, 610; II, 4609
igogine, I. *See also* Klein, G., 6492–3
igogine, I. and Bellemans, A. Application of the cell model to the statistical thermodynamics of solutions. Volume change of mixing in solutions of molecules slightly different in size, 3918
igogine, I. and Buess, R. Distribution of matter and the transport phenomena in the presence of a temperature gradient, and chemical reactions, 4645
igogine, I., de Brouckère, L. and Buess, R. Experiments on thermodiffusion in the liquid phase. Thermodiffusion in heavy water, 2247
igogine, I., Mathot, V. and Trappeniers, N. On the statistical theory of *r*-mer solutions, 3917
igogine, I. and Mazur, P. On the extension of thermodynamics to irreversible phenomena linked to internal degrees of freedom, 6738
igogine, I. and Philippot, J. Molecular theory of the liquid helium λ point, 3250. II. The coefficient of thermal expansion of liquid helium, 6722; III. The solutions of He^3 and He^4, 6723; IV. The cooperative character of the λ-point transition, 8371
igogine, I., Trappeniers, N. and Mathot, V. On the application of the cell method to *r*-mer liquids, 3916
ikhot'ko, A. F. *See* Broude, V. L., 748
im, R. C. D.C. field distribution in a 'swept intrinsic' semiconductor configuration, 7672. *See also* Shockley, W., 6046
imakoff, H. *See also* Chang, C. H., 4835
imakoff, H. and Porter, F. T. Atomic excitation and ionization accompanying orbital electron capture by nuclei, 3559
ime, H. A. The absorption and reflection of microwave radiation by a mercury-vapour discharge, 1774. The microwave admittance of a mercury-vapour discharge, 1775
ince, E. and Wooster, W. A. Determination of elastic constants of crystals from diffuse reflexions of X-rays. III. Diamond, 8066
ince, M. B. Experimental confirmation of relation between pulse drift mobility and charge carrier drift mobility in germanium, 6777. *See also* Goucher, F. S., 2452
Prince, R. G. H. *See* David, H. G., 1438
Pring, J. N. and Westrip, G. M. Electrometric determination of ozone at high dilutions, 1233
Pringle, G. E. *See* Peace, A. G., 2075
Pringsheim, P. Reversible bleaching of a band in the absorption spectrum of diamond, 8062. *See also* Delbecq, C. J., 6646
Pringsheim, P. and Voreck, R. C. Colour centres in diamonds, 2062
Prins, C. *See also* Michels, A., 6712
Prins, J. A., Schenk, J. and Dumoré, J. M. Temperature distribution at the end of a hot wire, 2398
Priporova, G. P. *See* Genkin, N. M., 5601
Priss, L. S. Theory of a rotation-vibration viscosimeter for highly viscous liquids, 639
Pritchard, B. S. and Stearns, E. I. Dye control with the *R*-Cam and ruler, 169, 3196
Pritchard, G. O., Pritchard, H. O. and Trotman-Dickenson, A. F. The photolysis of acetaldehyde, 5167
Pritchard, H. O. *See* Pritchard, G. O., 5167
Pritchett, W. C. Attenuation of radio frequency waves through the earth, 3763
Proctor, B. E. *See* Davison, S., 8649
Prodell, A. G. *See also* Koenig, S. H., 387
Prodell, A. G. and Kusch, P. The hyperfine structure of hydrogen and deuterium, 385
Proisy, P. The spectrum of NH_3 at low pressures, 4703. The spectrum of NH_3 and the spectrum of comets, 6416
Prowse, W. A. and Lane, P. E. Breakdown of a gas subject to crossed electric fields, 8434
Prudhomme, R.-O. and Busso, R.-H. The emission of ultra violet from water under the action of ultrasonics, 2267
Pruett, C. H. *See* Roggenkamp, P. L., 1869
Prugne, P. and Leger, P. Uniform surface metallization by evaporation from one or more emission surfaces, 1176
Pruss, P. Kh. *See* Breĭdo, I. I., 6362
Pryce, M. H. L. A theoretical attempt to predict the excited states of nuclei in the neighbourhood of ^{208}Pb, 374. Spinor formulation of beta-decay and similar interactions, 1385. The diffraction of radio waves by the curvature of the earth, 4931. *See also* Guggenheim, E. A., 4374
Pryde, J. A. and Jones, G. O. Properties of vitreous water, 1954
Przibram, K. On the development history of infrared-sensitive phosphors, 773. Coloration and luminescence, 7295
Ptitsȳn, O. B. *See* Vol'kenshteĭn, M. V., 5764
Puchegger, F. The mechanical and chemical behaviour of calcite cleavage faces, 1161
Pucher, W. The form of the negative pre-breakdown discharge in air at atmospheric pressure, for impulse voltages, 4819. Breakdown of air, with negative impulses, in sphere-plane spark gaps, 4820
Pugh, E. M. *See also* Foner, S., 6977; Schindler, A. I., 1794
Pugh, E. M. and Rostoker, N. Hall effect in ferromagnetic materials, 8599
Pugh, S. F. *See* Pratt, P. L., 3709
Pugliese, J. *See* Galloni, E. E., 1265
Pujolle, J. and Lamoral, R. Frequency modulation in architectural acoustics, 97
Pullan, G. T. The thermo-electric behaviour of tin and silver at liquid-helium temperatures, 4817
Pullar, J. D. and Dymond, E. G. The penetrating component of cosmic radiation in the upper atmosphere, 7775
Pullin, A. D. E. *See* Bernstein, H. J. 3119
Pullman, B., Berthier, G. and Baudet, J. Natural hypsochromic shifts on phenyl substitution, 3504
Pumphrey, W. I. A dislocation model for the study of boundary phenomena and deformation in metals, 3647
Pungs, L. *See* Kröner, K., 1624
Pupke, H. On bridging between copper electrodes in a nitrogen discharge, 1654. Analysis of counter tube measurements. I, 6877; II, 7744
Puppi, G. *See also* Clementel, E., 8498
Puppi, G., de Sabbata, V. and Manaresi, E. Excitation of the nucleus by the absorption of π-mesons. I. General considerations, 7908

Purbrick, R. L. Construction of a diffraction grating spectrograph, 3981

Purcell, E. M. The lifetime of the $2^2S_{1/2}$ state of hydrogen in an ionized atmosphere, 3816. *See also* Carr, H. Y., 357; Reif, F., 7796

Purcell, W. J. *See* Woodruff, O. J., Jr, 7947

Purkis, H. J. *See* Parkin, P. H., 3074

Pursey, D. L. Symmetry properties of a universal interaction, 3867

Pursey, H. Effect of variation in diameter on the torsional vibration of bars, 668. The motional impedance of simple sources in an isotropic solid, 3052. *See also* Bradfield, G., 7985

Püschel, B. On voltage measurements on Rochelle salt under compressive load, 1625

Putley, E. H. The conductivity and Hall coefficient of sintered lead sulphide, 226. Intrinsic conduction in PbS, PbSe, PbTe, 3299. Thermo- and galvanomagnetic coefficients for semiconductors, 3304

Putman, J. L. *See* Seligman, H., 1045; Whitehouse, W. J., 5051

Putnam, W. E. and Kilpatrick, J. E. Pressure virial coefficients in terms of cluster integrals, 5903. The general relation between the density virial coefficients and the pressure virial coefficients, 6551

Puymorin, R. d'Aubry de. *See* d'Aubry de Puymorin, R.

Pyaskovskaya-Fesenkova, E. V. Some properties of the atmospheric indicatrix for scattered light, 5810

Pyatt, E. C. Simplified brightness temperature pyrometer using photoconductive cell, 2424

Quan Pham Man. *See* Pham Man Quan.

Quaranta, A. A. and Pancini, E. The disintegration of μ mesons in carbon, 7949

Quareni, G. *See* Paganelli, M., 1866

Quenouille, M. H. Associated measurements, 4579

Quercia, I. F. and Rispoli, B. Zenithal dependence of the penetrating component of cosmic radiation, 8501

Querzoli, R. *See* Ageno, M., 2363, 2719, 3601, 8470, 8686

Quinn, R. S. *See* Mador, I. L., 1510

Quiring, H. Upper wind and Kepler motion, 8126

Qurashi, M. M. An analysis of the efficiency of convergence of different methods of structure determination. I. The methods of least squares and steepest descents: centrosymmetric case, 8084. A discussion of the Cox and Shaw factor for oblique incidence and the film-to-film factor in multiple-film exposures, 8784

Qurashi, M. M. and Vand, V. Weighting of the least-squares and steepest-descents methods in the initial stages of the crystal-structure determination, 8078

Raaen, V. F. *See* Ropp, G. A., 1205

Rabinovitch, B. S., Douglas, J. E. and Looney, F. S. The thermal *trans-cis* isomerization of dideuteroethylene, 1229

Rabinowicz, E. Autoradiography of metal surfaces using a radiochemical method, 2128. On the looseness of wear fragments, 4434. *See also* Burwell, J. T., 3671

Rabinowitch, E., Jacobs, E. E., Holt, A. S. and Kromhout, R. Absorption spectra of crystalline chlorophyll derivatives, 1513

Racah, G. Term values in the F^3 electron configuration, 382

Racah, G. and Talmi, I. The pairing property of nuclear interactions, 4957

Radczewski, O. E. Estimation of minerals by diffraction in the electron microscope, 5735

Radhakrishnan, T. and Ramachandran, G. N. The dispersion formulae of solids, 3973

Radicati, L. A. Isotopic spin and Coulomb forces, 2957

Rado, G. T. Theory of the microwave permeability tensor and Faraday effect in nonsaturated ferromagnetic materials, 2577. Magnetic spectra of ferrites, 8535

Rado, G. T., Wright, R. W., Emerson, W. H. and Terris, A. Ferromagnetism and very high frequencies. IV. Temperature dependence of the magnetic spectrum of a ferrite, 959

Radvanyi, P. A measurement of the L/K capture ratio in ^{79}Kr, 407

Rae, D. *See* Thornton, S., 2988

Raes, A. C. Recent progress in architectural acoustics,

Raether, H. On the formation of gaseous discharg 8430. *See also* Ehlers, H., 6307; Wesemeyer, 1217

Ragazzini, J. R. and Reynolds, G. The electro complex plane scanner, 6383

Rahbek, H. *See* Korndorffer, A., 2044

Rahman, A. Computation of intensities of vibratio transitions in the electronic ground state of a Mo anharmonic oscillator, 3493. Polarizability of t hydrogen molecular-ion, 7019. Accuracy of p turbation calculated from inaccurate unperturb wave function (with special reference to elect polarizability of molecules), 7020. Enumeration physical constants of crystals, 8760. *See a* Manneback, C., 5631

Raïevski, V. Method of counting permitting measurement of the multiplication factor in a pi 5097. Calibration of boron ionization chamb indicating pile power-level, by a measurement of activity, 5536. Transitory conditions in a heavy wa reactor, 8691

Raïevski, V. and Pellé, M. Continuous neutr detector for the measurement of densities in a pi 8709

Raĭskiĭ, S. M. A generator of short optical signals square waveform, 1568

Raitiere, L. P. Computation of spherical-mirr systems by means of finite-difference equations, 14

Rajewsky, B. The limits of the target theory of biological action of radiation, 4523

Rakshit, S. C. *See* Ghosh, B. N., 6811

Ramachandra Rao, S. and Leela, M. Magne study of some forms of corundum, 6954

Ramachandran, G. N. *See* Radhakrishnan, T., 39 Ramaseshan, S., 8780

Ramaiah, N. A. *See also* Dogra, O. P., 7701 Saxena, A. P., 3331, 7698–9; Subrahmanyam, 8433

Ramaiah, N. A., Bhatawdekar, M. G. and Subra manyam, N. Dependence of Joshi effect on el tronic part of the discharge current, 6821

Ramaiah, N. A. and Tiwari, G. S. Pulse behavio in the production of negative Joshi effect in wa vapour, 4123

Ramakrishna, B. S. *See* Lakshmana Rao, S. 2890

Ramakrishna Rao, V. and Sastri, M. L. N. Spect scopic studies in the near ultra-violet of the th isomeric dimethylbenzene vapors. III. Fluor cence of meta dimenthylbenzene, 150

Ramakrishnan, A. Stochastic processes associated w random divisions of a line, 8180

Ramakrishnan, A. and Mathews, P. M. A stocha problem relating to counters, 8181

Ramanathan, A. S. *See* Das, A. K., 6424

Ramart-Lucas, P. Influence of the steric effect and cyclization on the electronic structure of carbon a nitrogen, 5622

Ramasastry, C. Ultra-violet bands of mercury iod molecule. V, 3114. Band spectrum of carb disulphide. III, 3115

Ramaseshan, S. and Ramachandran, G. N. Influe of mosaicity on the Bragg reflexion of polari X-rays, 8780

Ramat, M. *See* Della Corte, M., 8167, 8169

Ramberg, E. G. and Malter, L. Potential distribu for space-charge limited current between a pl accelerating grid and parallel anode, 1705

Ramberg, H. Some crystal energetic relationships oxysalts, 497

Ramer, L. G. *See* Hardy, H. C., 3059

Ramm, C. A. *See* Collins, E. R., 3589–90

Ramsauer, R. Free interfacial energy and strain rele in brittle bodies, 8714

Ramsay, D. A. Absorption spectra of SH and produced by flash photolysis of H_2S and D_2S, 15 Absorption spectra of free radicals in continuou irradiated photochemical systems, 2345. Abso tion spectrum of free HCO radicals, 5964

Ramsay, J. V. A theoretical investigation of the ph contrast image of a single isolated continu irregularity, 3205. *See also* Martin, L. C., 321

sey, N. F. Pseudo-quadrupole effect for nuclei in molecules, 2598. Spin interactions of accelerated nuclei in molecules, 4258. Electron coupled interactions between nuclear spins in molecules, 7006. *See also* Harrick, N. J., 369, 5655; Hintz, N. M., 434; Kruse, U. E., 2703
sey, N. W. Effect of temperature on the conductivity induced in insulators by X-rays, 8399
sey, W. E. *See* Porter, W. C., 927
sey, W. J. and Yost, D. M. The iron catalyzed reaction between nitrosyl disulfonate and hydroxylamine monosulfonate ions, 7237
dall, J. E. *See* Hines, H. M., 1317
dall, K. C. *See* Dovey, D. M., 4400
dall, R. H. An introduction to acoustics, 666
dle, T. C., Cassels, J. M., Pickavance, T. G. and Taylor, A. E. Neutrons produced by high energy protons, 7914
ig, O. Determination of the shape of thin single crystal lamellae with the help of apparent structures arising from crystal lattice reflections, 5222
ig, O. and Schluge, H. Dark field microscopy and defined lattice reflections, 1186
ik, D. H. The multiple-slit diffraction pattern, 164. Some methods of determining molecular constants, 1807. *See also* Wiggins, T. A., 7580
nk, D. H., Bennett, J. M. and Wiggins, T. A. Interferometric wavelength measurements in the near infrared, 3983. Fine structure of the $2\nu_3$ band of methane, 7571
nk, D. H. and Cronemeyer, D. C. The infrared absorption characteristics of thermiated germanium, 4007
nk, D. H., Rix, H. D. and Wiggins, T. A. Some bands of methyl bromide in the near infrared under high resolution, 3140
nk, D. H., Ruth, R. P. and Vander Sluis, K. L. Precise determination of the velocity of light derived from a band spectrum method, 100
nk, D. H., Shull, E. R. and Wiggins, T. A. High resolution spectroscopy in the infrared, 3984
nk, D. H. and Wiggins, T. A. Double-passing a plane grating, 1491
nke, O. F. Effect of glare and course of re-adaptation, 4529
nken, H. B. *See* Brown, J. L., 4531
nkin, D. *See* Stratton, W. R., 438
nzi, I. The ionosphere during the partial eclipse of the sun of August 20, 1952, at Buenos Aires, 7349
o, A. S., Balasubrahmanyam, V. K., Gokhale, G. S. and Pereira, A. W. High altitude measurements of the intensity of cosmic radiation at magnetic latitudes 3° N and 19° N, 7777
o, B. R. and Rao, K.S. A new precision method for the measurement of ultrasonic velocities in liquids, 6554
o, K. N. and Sarma, K. S. Band spectrum of CO^+. The Baldet-Johnson system ($B^2\Sigma$–$A^2\pi$), 6414
o, K. S. *See* Rao, B. R., 6554
o, K. Suryanarayana. *See* Suryanarayana Rao, K.
o, K. V. Krishna. *See* Krishna Rao, K. V.
o, P. Tiruvenganna. *See* Tiruvenganna Rao, P.
o, S. Ramachandra. *See* Ramachandra Rao, S.
o, S. K. Lakshmana. *See* Lakshmana Rao, S. K.
o, V. Ramakrishna. *See* Ramakrishna Rao, V.
oult, G. and Fanguin, R. An ultra-high-frequency discriminator, 6152
oult, G. and Lalande, A. Transient discharges in a mercury arc, 5485
ppaport, P. *See* Linder, E. G., 6848
sbash, D. J. The production of water spray of uniform drop size by a battery of hypodermic needles, 6525
sch, J. An improved method of contact radiography, 6363
setti, F. *See also* Battey, J., 1878; Bolgiano, P., 2665
setti, F. and Booth, E. C. Gamma-ray spectrum of ionium (Th^{230}), 7104
skovan, J. *See* Busch, R. H., 548
smussen, J. O., Jr., Thompson, S. G. and Ghiorso, A. Alpha-radioactivity in the 82-neutron region, 1877
strup-Andersen, J. *See* Bak, B., 4715–16, 7573
Rathenau, G. W. Saturation and magnetization of hexagonal iron oxide compounds, 8542. *See also* Stuyts, A. L., 962
Rathenau, G. W., Smit, J. and Stuyts, A. L. Ferromagnetic properties of hexagonal iron-oxide compounds with and without preferred orientation, 961
Rathgeber, H. D. *See* Parry, J. K., 6912
Ratliff, F. *See* Riggs, L. A., 6338
Ratner, L. T. *See* Murray, R. L., 2496
Rau, K. H. *See* Hanle, W., 1543
Rau, W. On the influence of drop volume on the super-cooling of water drops and the significance of the freezing nuclei spectrum, 4763
Rauch, C. *See* Heer, C. V., 4903
Raudorf, W. R. Particle properties of radiant energy in wave guides, 1782
Rausch, W. Adsorption of *n*-pentane, *n*-propyl chloride and other vapours on metallic zinc and on thin films of zinc phosphate 6299*. *See also* Havemann, R., 6284, 6628
Ravenhall, D. G. *See* Wolfenstein, L., 31
Rawer, K. Calculation of sky-wave field strength, 1790. *See also* Argence, E., 3461; Harnischmacher, E., 1297
Rawnsley, A. I. *See* Harris, J. D., 6344
Rawson, E. B. and Beringer, R. Atomic oxygen *g*-factors, 1037
Rawson, H. A note on the velocity of crack propagation in glass, 3662. Internal stresses caused by disorder in vitreous materials, 4420
Raychaudhuri, A. Arbitrary concentrations of matter and the Schwarzschild singularity, 2168
Raychaudhuri, A. K. Radiation sphere in Einstein universe, 3079. Pure radiation fields with central symmetry in general relativity theory, 8204
Raymond, W. F. *See* Merridew, J. N., 3706
Raynor, G. V. *See* Berry, R. L., 2827; Henry, W. G., 7326
Rayski, J. On a regular field theory, 7427
Rayski, S. M. *See* Raĭskiĭ, S. M.
Read, T. A. *See* Frankl, D. R., 3725
Reamer, H. H. and Sage, B. H. A method of control of a predetermined flow rate, 5887
Reardon, W. A., Krone, R. W. and Stump, R. Neutron capture gamma-rays in cadmium, cobalt, and chlorine, 7106
Reasbeck, P. *See* Paneth, F. A., 8510
Recklinghausen, D. von. *See* von Recklinghausen, D.
Recknagel, A. and Haufe, G. On the Stigmator of the electron microscope, 1681
Redding, J. L. *See* George, E. P., 6926
Redding, V. L. *See* Ording, J. R., 5931
Redfield, A. G. Electronic Hall effect in NaCl, 8600
Redhead, M. L. G. The production of bremsstrahlung in electron-electron collisions, 3869
Redhead, P. A. and Crowell, C. R. Analysis of the linear r.f. mass spectrometer, 3366
Rediker, R. H. *See* Bridge, H. S., 309; Thompson, R. W., 5720, 7172
Redlich, M. G. Discontinuities in the binding energies of neutrons and protons in light nuclei, 375. Preferred ratios of energies of excited states of nuclei, 7035
Reeb, O. Maximum or minimum photometer, 6583. Quantities and units in illuminating engineering, 6588. Reduction in the number of units used in illuminating engineering and of special names for them, 6589
Reed, R. *See* Cosslett, V. E. [Conf. rep.], 3351
Reed, R. I. The pyrogenetic formation of ketones, 4437
Reed, S. G., Jr. Some examples of weak detonations, 1209
Reed, T. B. and Lipscomb, W. N. The crystal and molecular structure of 1, 2-dichloroethane at − 140° C, 8115
Reekie, J., Hutchinson, T. S. and Beaumont, C. F. A. X-ray scattering from liquid helium, 6250
Rees, A. L. G. Electron diffraction in the chemistry of the solid state, 5786. *See also* Coogan, C. K., 758; Cowley, J. M., 3753
Reese, R. M. *See* Dibeler, V. H., 3389
Reff, I. Nuclear photostar production, 7145
Regel', A. R. *See* Mokrovskiĭ, N. P., 6033; Zhuze, V. P., 6800

Regemorter, H. van. *See* van Regemorter, H.
Regener, V. H. *See* Froman, D., 7763
Regier, A. A. and Hubbard, H. H. Status of research on propeller noise and its reduction, 5362
Régnier, A. On the conservation of charge, 1394
Reichardt, W. *See* Broser, I., 5972
Reid, C. Scintillators and energy transfer processes, 147. *See also* Moodie, M. M., 347
Reid, J. M. *See* Wild, J. J., 5813
Reif, F. and Purcell, E. M. Nuclear magnetic resonance in solid hydrogen, 7796
Reiffel, L. *See* Burgwald, G. M., 6191
Reik, H. G. The theory of irreversible processes. I, 5149; II, 5150; III, 5151
Reĭkhrudel', É. M., Chernetskiĭ, A. V., Mikhnevich, V. V. and Vasil'eva, I. A. Difficulties of a discharge in a magnetic field with a special configuration of the discharge gap, 6065
Reilley, E. M. *See* Bender, R. S., 270
Reilly, E. F. Electrostatic energy matrices of the configuration f^4, 7849
Reimann, A. L. Vacuum technique, 77
Reimer, L. *See* Kappler, E., 8723
Reinebeck, L. *See* Schüler, H., 737
Reinecke, L.-H. The mechanism of the Lewis-Rayleigh afterglow in active nitrogen, 8614
Reiner, H. A possible cross-viscosity effect in air, 73
Reines, F. *See also* Cowan, C. L., Jr, 6108
Reines, F. and Cowan, C. L., Jr. A proposed experiment to detect the free neutrino, 5112
Reinisch, L. Study of the dielectric behaviour of cyclohexanol at low temperatures, 7657
Reiss, H. Chemical effects due to the ionization of impurities in semi-conductors, 6776. *See also* Glazer, H., 5647
Reitz, R. *See* Bernardini, G., 5075
Remley, M. E., Jentschke, W. K. and Kruger, P. G. Neutron-proton scattering using organic crystal scintillation detectors, 4150
Remy, E. *See* Sittkus, A., 8647
Renard, G.-A. On the inner deceleration spectrum of ^{32}P in the low energy region, 7904
Renaud, P. Rationalization of discovery. I. Definition of elements of dissymetry, 4581. Theoretical yield of a spiral thermal diffusion column, 7058
Renaudin, D. The character and measurement of brush discharge ionization in dielectrics, 877
Renes, P. A. *See* Gerding, H., 4728
Rénet, C. and Viénot, J. Study of the diffraction figure of a three-aperture system, 4043
Renner, H. and Theimer, O. The Raman spectrum and structure of nitric acid and its aqueous solutions, 1550
Rennes, A. B. Van. *See* Van Rennes, A. B.
Rennie, C. A. Lecture notes on pile theory, 5711
Renninger, M. Experimental realization of dynamic reflection curves of ideal crystals with monochromatic X-radiation, 6314. On the electron density distribution in the rocksalt lattice, 7323. *See also* Krause, B., 5895
Rense, W. A. Intensity of Lyman-alpha line in the solar spectrum, 6427. *See also* Pietenpol, W. B., 4567
Renton, C. A. *See* Mendelssohn, K., 7688; Olsen, J. L., 1647
Renzema, T. S. Electron diffraction investigation of polished surfaces, 1976
Repp, G. W. *See* Jarmie, N., 8701
Rérat, C. *See* Berthelot, J., 8070
Rescigno, L. *See* Carrelli, A., 8013–14
Resler, E. L., Lin, S.-C. and Kantrowitz, A. The production of high temperature gases in shock tubes, 681
Retz-Schmidt, T. *See* Neuert, H., 5971
Reulos, R. Quantum spectrum of masses, lengths and time, 7425
Reynolds, F. H. An electrical manometer for gas pressures up to 40 mm of mercury, 3895
Reynolds, F. W. and Stilwell, G. R. Mean free paths of electrons in evaporated metal films, 214
Reynolds, G. *See* Ragazzini, J. R., 6383
Reynolds, J. H. The isotopic constitution of silicon, germanium and hafnium, 7059
Reynolds, J. L. *See* Beranek, L. L., 3069
Reynolds, P. M. *See also* Verma, A. R., 7283
Reynolds, P. M. and Verma, A. R. Growth and opti properties of stearic acid crystals, 4469
Reynolds, S. A., Leddicotte, G. W. and Mahlm H. A. Gamma-radiation from arsenic 77, 7105
Reynolds, S. E. Thunderstorm-precipitation grow and electrical-charge generation, 8134
Řezníček, J. and Malý, K. Electromagnetic fi equation for low speed systems, 976
Rhoderick, E. *See* Hughes, V., 7846
Rhodes, J. E., Jr. Heat transfer to a boiling liquid, 32 Analysis and synthesis of optical images, 4687
Rhys-Jones, D. C. *See* Bronowski, J., 3654
Ribe, F. L. *See* Battat, M. E., 1922
Ricamo, R. *See* Meier, R., 8704
Rice, D. K. and McNally, F. A. Replica techniq for grating ruling engine adjustments, 166
Rice, O. K. Irreversible processes with application helium II and the Knudsen effect in gases, 24 Reply to Careri's "Note on the recombination free atoms," 5616
Rice, O. K. and Widom, B. The thermodynamics the helium film, 6009
Rice, P. L. Some methods for evaluating trends in ti series of tropospheric radio field strength data, 28
Rich, A. *See* Edsall, J. T., 1563
Rich, S. R. *See* Roth, W., 6512
Richards, E. W. T. Ionization in liquids due to alp particles, 6904
Richards, F. M. *See* Low, B. W., 529
Richards. H. T. *See* Donahue, D. J., 2693; Jon K. W., 7862
Richards, O. W. *See* Bennett, A. H., 789
Richards, R. E. *See* Evans, D. F., 3438
Richardson, E. G. Ultrasonic physics, 693. Evapor tion of a liquid drop into a gas stream, 1581. Pr cesses of convection and evaporation, 4761. Soun of jets, 7521.
Richardson, J. M. Electron removal in krypton afte glows, 871.
Richardson, J. M. and Kennedy, W. B. Atmospher winds and temperatures to 50-kilometers altitude determined by acoustical propagation studies, 128
Richardson, J. R. *See* Glass, N. W., 5672; Sach D. C., 4153
Richardson, L. F. The criterion of atmospheric tu bulence, 5239
Richardson, O. *See* Foster, E. W., 6610
Richert, R. *See* Muller, T., 2506
Richman, C. *See* Cartwright, W. F., 7954
Richter, B. *See* Bitter, F., 7558, 8632
Richter, H. and Breitling, G. Structure of amorphou antimony, 8715
Richter, H., Kulcke, W. and Specht, H. Structur of amorphous Se, 1179
Rickayzen, G. *See also* Eden, R. J., 6462
Rickayzen, G. and Kursunŏglu, B. Unified fiel theory and Born-Infeld electrodynamics, 2932
Rideal, E. *See* Hillson, P. J., 4103
Ridout, M. S. Height of the potential barrier in barri layer cells, 3307
Rieck, J. Projector lamp and useful light flux in pr jector, 6688
Riede, D. *See* Hanle, W., 4861
Rienitz, J. Observations on the angle-mirror inte ferometer and aperture chamber [Lochkammer], 474
Ries, H. *See* Weigel, R. G., 6586
Rietveld, A. O., Van Itterbeek, A. and van den Ber G. J. Measurements on the viscosity of mixtur of helium and argon, 8273
Riezler, W. and Porschen, W. Natural radioactivit of bismuth, 2653
Riezler, W. and Rudloff, A. Observations of μ-meson of short range, 1144
Riezler, W. and Werz, R. On a simple continuo [-ly sensitive] cloud chamber, 6115
Rigg, T., Scholes, G. and Weiss, J. Chemical actions ionising radiations in solution. X. The action X-rays on ammonia in aqueous solution, 3687
Riggert, K. H. *See* Schäfer, K., 6018
Riggs, L. A., Ratliff, F., Cornsweet, J. C. and Cor sweet, T. N. The disappearance of steadily fixat visual test objects, 6338
Righini-Crini, B. The influence of the phenomenon diffraction at the slit of a spectrograph on t intensity of spectral lines, 3099

AUTHOR INDEX

iondi, O. *See* Brini, D., 1715
iskiĭ-Korsakov, A. V. On sound radiation from a plate in complex types of vibrations, 1460
isky, A. Apparatus permitting the direct photography of reciprocal space, 2814
ehart, J. S. Scabbing of metals under explosive attack: multiple scabbing, 1163. Surface energy, a mode for energy absorption during impact, 3892. *See also* Pearson, J., 3030; White, W. C., 116
ehart, J. S. and Pearson, J. Engravement of transient stress wave particle velocities, 4431
g, J. *See also* Oxley, C. L., 7730
g, J. and Wilcock, W. L. Multi-layer dielectric reflecting films at wave-lengths between 4000 and 4600 Å, 4738
go, G. R. *See* Hamermesh, B., 5083
ou, M. On the excitation of atomic electrons during the α-disintegration of polonium 210, 1875. Study of *L* spectra excited by internal conversion, 5501. De-excitation of a nucleus by the creation of positon-negaton pairs, 5697. The excitation of atomic electrons in α-disintegrations, 7859. *See also* Bouissières, G., 7102; Falk-Vairant, P., 5691; Teillac, J., 7893
elle, M. Fabre de la. *See* de la Ripelle, M. Fabre
berg, E. *See* Andersen, F., 3137
co, M. Interpretation of an interference phenomenon by observers in relative motion, 1476
eman, J. and Young, I. G. Mass-energy relationship, 6445
poli, B. *See* Quercia, I. F., 8501
chie, R. H. *See* Hurst, G. S., 8467
enour, G. J. *See* Baker, E. B., 3292
schl, R. and Müller, R. The spectra of rubies, 1514
son, D. M. *See* Kaplon, M. F., 311, 6127
ter, H. L. *See* Morozumi, C., 8085; Simons, J. H., 2224
ter, R. M. *See* Guyton, A. C., 1304
ter, V. W., Warren, S. R. Jr and Pendergrass, E. P. Roentgen doses during diagnostic procedures, 573
tner, E. S. A theoretical study of the chemistry of the oxide cathode, 7749
vault, R. Atmospherics, 7366
vier, D. Note on the connection between spin and statistics in the theory of elementary particles, 7445
vlin, R. S. *See* Greensmith, H. W., 2989
k, H. D. The infrared spectrum of fluoroform from 2·2 to 20 μ, 5959. *See also* Rank, D. H., 3140
af, D. *See* Davenport, P. A. 3588; Eliot, E. A., 3582; Jarvis, R. G., 4352, 7135
bens, E. *See* Klumb, H., 5900
berts, A. and Tinlot, J. Charge-exchange scattering of 34-MeV π-mesons in hydrogen and deuterium, 6236
berts, F. and Young, J. Z. The flying spot microscope, 175
berts, F. F. *See* Bacon, G. E., 8116
berts, J. *See* Bouchez, R. 7835; Fortescue, R. L., 248
berts, J. H. *See* Darlington, L. E., 6231
berts, L. *See* Pack, D. C., 7509
berts, L. D., Sartain, C. C. and Borie, B. Measurement of the nuclear and electronic contributions to the specific heat of neodymium ethyl sulfate near 1°K, 8385
berts, L. E. J. Adsorption on irradiated graphite, 5181. *See also* Dresel, E. M., 3633
berts, N. F. and Wilson, L. T. Counting pulses of various forms and occurrence intervals by electronic counters, 3380
berts, P. W. Some comments on the resolution of scintillation spectrometers, 4160
berts, R. *See* Darwent, B. de B., 4447
berts, S. Field strength and temperature studies of electroluminescent powders in dielectric media, 776. Trends in research and development in dielectrics—1951, 828. Dielectric changes of electroluminescent phosphor during illumination, 6666
berts, S. *See also* Thurnauer, H. [Eds.], 828
berts, T. E., Jr. Theory of the single-wire transmission line, 2556
berts, V. *See also* Brown, D. A. H., 3100
berts, V. and Young, A. S. The application of lead selenide photoconductive cells to infra-red spectroscopy, 6605
Robertson, A. J. B. The ionization and dissociation of hydrogen peroxide induced by electron impact, 4886
Robertson, A. P. *See* Cruickshank, D. W. J., 8791
Robertson, J. H. *See* Beevers, C. A., 553
Robertson, J. M. *See* Donaldson, D. M., 5785
Robertson, W. D. The capacity of polarized platinum electrodes in hydrochloric acid, 5756
Robey, D. H. Magnetic dispersion of sound in electrically conducting plates, 6570
Robin, J. *See also* Granier-Mayence, J., 5742
Robin, J. and Robin, S. Study of the variation of the intensity of visible bands of oxygen, compressed up to 1300 kg/cm^{+2}, as a function of pressure, 5395. Spectrographic absorption in the medium ultraviolet of oxygen compressed up to 1500 atmospheres, 6640
Robin, J., Robin, S. and Vodar, B. A powerful source for the far ultraviolet without a window, 5432
Robin, S. Photometric measurement of optical constants in the Schumann region of the ultraviolet, 778. Measurement of the reflectivity of thick metallic films (Au, Pt, Cr) in the Schumann range and determination of the optical constants, 4737. Solubility in compressed gases, 7500. Measurements of reflecting powers of thick metallic films (rhodium, beryllium, nickel) in the Schumann region, 7605. *See also* Bergeon, R., 119; Coulon, R., 5386, 6622, 6637, 7574; Granier-Mayence, J., 731, 5742; Robin, J., 5395, 5432, 6640
Robin, S. and Vodar, B. Apparatus for the measurement of reflecting power in the vacuum ultraviolet, 777
Robins, W. H. M. Measurement of thicknesses of fine particles, 637
Robinson, B. L. and Madansky, L. Polarization correlations of the gamma-rays of Cs^{134} and of annihilation radiation, 1087
Robinson, E. Spark counters for short time interval cosmic ray measurements, 3403. Short time interval measurements on pairs of associated cosmic ray particles, 3404
Robinson, E. S. *See* Allred, J. C., 1114
Robinson, F. N. H. *See* Bishop, G. R., 1896; Daniels, J. M., 1841, 7631
Robinson, G. and Van Allen, R. Precision measurements with a cathode-ray oscilloscope, 2922
Robinson, G. P. *See* Lamphere, R. W., 1684
Robinson, H. G., Dehmelt, H. G. and Gordy, W. Pure nuclear quadrupole spectrum of Bi^{209} in bismuthtriphenyl, 4952
Robinson, H. L. Diffraction patterns on circuit apertures less than one wavelength in diameter, 2565
Robinson, I. R. *See* Spear, P., 4400
Robinson, L. B. Production of fissionable isotopes in a thermal reactor, 6233. *See also* Haslam, R. N. H., 5042
Robinson, S. A., Ostapkovich, P. L., Schlegel, E. S. and Gazzara, C. P. Perfect demarcation of the diamond crystal structure in germanium, 1240
Robinson, T. S. Optical constants by reflection, 2316
Robl, H. Compton scattering in a homogeneous magnetic field, 2675. Pair creation in a homogeneous magnetic field, 2679
Roche, A. On the origin of inversions of magnetization found in rocks in the Auvergne, 3758
Rochester, G. D. and Butler, C. C. The new unstable cosmic-ray particles, 8488
Rochester, G. D. and Wilson, J. G. Cloud chamber photographs of the cosmic radiation, 1717
Rochet, G. and Daudin, J. On the origin of cosmic ray bursts, 1724
Rodelius, N. W. *See* Lewis, R. E., 171
Rodgers, E. and Rodgers, S. H. Concerning statistical fluctuations in radioactive phenomena, 1043
Rodgers, S. H. *See* Rodgers, E., 1043
Rodigin, V. N. On the theory of crystallization, 6305
Rodney, W. S. *See* Spindler, R. J., 3091; Stephens, R. E., 2317
Rodriguez, M. Perez. *See* Perez Rodriguez, M.
Roe, G. M. Convergence of intermolecular force series, 994
Roe, G. M., Epstein, L. F. and Powers, M. D. Low temperature second virial coefficients for a 6–9 potential, 664

Roe, I. G. The electrochemistry of non-aqueous solutions, 8011

Roebuck, J. R. On the use of the Joule–Thomson effect to measure the work equivalent of heat. Thermodynamic theory, 204*

Roederer, J. G. The absorption at the nucleon component of cosmic rays at geomagnetic latitude 21° S, 3411

Roesler, F. C. On magneto photophoresis, 8605

Roesler, F. C. and McCusker, C. B. A. On the growth of a cosmic-ray initiated jet in a nucleus, 7783. Anisotropic distribution of secondaries in extreme energy cosmic-ray stars, 7785

Rögener, H. *See* Brauer, G., 6317

Roger, F. On a corpuscular image and matrix extension of the wave method of molecular orbitals, 7825

Rogers, D. Alleged optical activity in crystal class *m*, 8043

Rogers, D. and Wilson, A. J. C. The probability distribution of X-ray intensities. V. A note on some hypersymmetric distributions, 8079

Rogers, F. T., Jr. Convection currents in porous media. V. Variational form of the theory, 6706. *See also* Morrison, H. L., 179

Rogers, G. L. An extended Smith–Lagrange invariant, 7546

Rogers, T. F. *See* McNamara, F. L., 3952

Rogers, T. H. Uses of low voltage X-ray tubes with thin beryllium windows in nondestructive testing, 5511

Roggenkamp, P. L., Pruett, C. H. and Wilkinson, R. G. The disintegration scheme of V^{48}, 1869

Rogosa, G. L. *See also* Brown, L. C., 537

Rogosa, G. L. and Schwarz, G. X-ray transmission studies of large imperfect crystals, 7301

Rogozinski, A. On the problem of time delays between cosmic ray particles, 7784. *See also* Picard, E., 7737

Rohde, F. Measurement of the decay time of luminescence with the phase tube, 4723. *See also* Schmillen, A., 5969

Rohloff, E. An optical investigation of the plastic deformation of silver chloride, 491

Röhm, F. *See* Scholl, H., 6267

Rohner, F. Criterion for the onset of slip in metallic polycrystals, 1984

Rohr, R. C., Rohrer, E. R. and Macklin, R. L. Proportional fission neutron counters, 919

Rohrbach, C. Measurement by electrical resistance wire strain gauges. I. Wire strain gauges and accessories in general, 6500

Rohrer, E. R. *See* Rohr, R. C., 919

Roig, J. and Bécart, M. The excitation of a hollow cathode discharge tube with impulses: production of spark lines, 3338

Roig, J. and Collet, E. Influence of the wavelength on the sharpness and brilliance of the maxima of the rings formed by a semi-silvered Fabry–Perot etalon, 6669

Rollefson, G. K. *See* Bailey, E. A., Jr, 7590

Roller, D. A proposed procedure for selecting and using symbols for physical units, 3844

Rollett, J. S. *See* Cruickshank, D. W. J., 8792

Rollin, B. V. and Simmons, E. L. Long wavelength infra-red photoconductivity of silicon at low temperatures, 3312–13

Rollin, B. V. and Templeton, I. M. Noise in semiconductors at very low frequencies, 4800

Romand, J. *See also* Granier-Mayence, J., 5394, 8323

Romand, J., Aumont, R. and Vodar, B. Further contribution to the study of the variation of the electrical resistance of very thin metallic deposits as a function of the applied voltage, 7666

Romand, J. and Granier-Mayence, J. Absorption spectrum of solid nitrous oxide in the Schumann region, 1520

Romanowski, M. Modified bridge method for absolute determination of ohm, 6765

Romers, C. The structure of oxamide, 8800

Rompe, R. *See* Böer, K. W., 876

Ronchi, L. On the aberrations of Fresnel lenses of plastic material. II, 3086. *See also* Di Francia, G. Toraldo, 571

Ronchi, L. and Toraldo Di Francia, G. Geomet performance of Fresnel mirror, 3084. On aberrations of Fresnel lenses of plastic material. I, 308 Application of the variational calculus to the dete mination of reflection coefficients, 4038

Ronchi, L., Toraldo Di Francia, G. and Zoli, M. Random circular gratings, 3181

Ronchi, L., Jr. *See* Della Corte, M., 8167; Mand M., 1726

Rooksby, H. P. *See* Willis, B. T. M., 2825

Roosbroek, W. van. *See* van Roosbroek, W.

Ropp, G. A. and Raaen, V. F. Effect of nuclear su stituents on the C^{14}-isotope effect in the saponificati of carboxyl-labeled ethyl benzoates at 25°c, 1205

Rørholt, B. A. Mechanical model of the ionosphe 7353

Rorschach, H. E., Jr. *See* Teasdale, T. S., 6795

Rosahl, D. Fluorescence spectra and quantum yiel of some solid organic substances under u.v. excita tion, 6652

Rosario, L. del. *See* del Rosario, L.

Rose, A. J. *See* Berthelot, J., 8070

Rose, B. *See* Newton, J. O., 4322

Rose, B. and Freeman, J. M. Inelastic neutron scatte ing in iron, 4362

Rose, D. *See* Harris, S. P., 7186*

Rose, D. C. and Voisin, A. G. The low energy spectru of cosmic-ray mesons at sea level at high geomagnet latitudes, 6921

Rose, H. The beta-gamma angular correlation ^{170}thulium, 1884. The beta-gamma angular corr lation of ^{76}arsenic, 7887

Rose, H. E. and Moss, G. Streaming potential a electro-osmosis: a model for the mechanism streaming potential, 1652

Rose, J. E. *See* Lanzl, L. H., 6216

Rose, M. E. Some problems arising in nuclear spectr scopy, 4979. The O^{14} β-decay and the Fer interaction, 6206. Angular correlation in allowe β-transitions, 7095 The analysis of angular corr lation and angular distribution data, 7857. *See al* Biedenharn, L. C., 4246; Drell, S. D., 420

Rose, M. E. and Perry, C. L. The effect of the fini de Broglie wavelength in the theory of beta-deca 5023

Rose, R. T. *See* Fessler, H., 4625

Rosen, B. The cometary emission near 4050 Å, 641 *See also* Barrow, R. F., 3992

Rosen, B. and Swings, P. Carbon stars, comets a combustion phenomena, 6436

Rosen, F. D. and Davis, W., Jr. Absolute bet counting of gases, containing P-32 using end-windo Geiger–Müller tubes, 6208

Rosen, J. *See* Lehovec, K., 5439

Rosen, L. Nuclear emulsion techniques for t measurement of neutron energy spectra, 8171. *S* *also* Allred, J. C., 911, 1114, 7185; Graves, E. R 2721

Rosen, L. and Allred, J. C. *d-d* elastic scattering 10·5 MeV, 1115

Rosen, P. The nonadditivity of the repulsive potenti of helium, 6162. On variational principles f irreversible processes, 6740. *See also* Margena H., 3489

Rosenberg, H. M. *See* Mendelssohn, K., 669 Olsen, J. L., 4758

Rosenberg, R. and Lax, M. High temperature su ceptibility of permanent dipole lattices, 3428

Rosenblum, E. S., Shrader, E. F. and Warner, R. M Jr. Absorption of 5·3-MeV, 10·3-MeV, a 17·6-MeV gamma-rays, 1091

Rosenblum, S. and Valadares, M. On nuclear A leve (first excited states), 1026. Classification of "radi of α-emitting nuclei as function of the neutr excess I, 3520

Rosenbluth, A. W. *See* Metropolis, N., 6026

Rosenbluth, M. N. *See* Metropolis, N., 6026

Rosenfeld, L. M. *See* Rozenfel'd, L. M.

Rosengren, J. W. *See also* Gilbert, W. S., 1128

Rosengren, J. W. and Dudley, J. M. High ener photoproton production by 322-MeV bremsstrahlun 2705

Rosenhead, L. A selection of tables for use in calcul tions of compressible flow, 3927

Rosenthal, I. L. *See* Rozental', I. L.

AUTHOR INDEX

nthal, J. E. *See also* Bramley, A., 156, 6667
nthal, J. E. and Bramley, A. Mechanism of conductivity in semiconducting phosphors, 220
nzweig, N. The configuration interaction between he odd terms in the iron group, 1036
F. D. Orientation studies of exaggerated grain growth in tungsten, 2805
, I. G. *See* Passerini, R., 6606
, J. *See* Amdur, I., 349
, M. Evidence for nonadditivity of nucleon moments n heavy nuclei, 1033. *See also* Charlesby, A., 4455
, M. and Charlesby, A. The effect of pile radiation on polymethyl methacrylate ("Perspex"). I, 8740
, M. A. S. *See* Ewan, G. T., 1081
el, J. *See* Bonanomi, J., 5405; Hahn, B., 7601; Hänni, H., 5077
er, W. G. V. *See* Lees, C. F., 3370, 4348
etti, C. Interferometric apparatus for ultrasonic detection, 2289
etti, U. P. Measurement of the modulus of elasticity of materials with the electronic vibrometer, 1189
i, B. High-energy particles, 4193. *See* Annis, M., 8483; Bridge, H. S., 6122, 7178
ler, F. On a structure in the continuous radiation of high pressure mercury vapour discharges, 1496
man, M. G. and Yarwood, J. The accuracy of the Knudsen effusion method for measuring vapor pressures, 8360
um, L. van. *See* van Rossum, L.
agni, A. *See* Ceccarelli, M., 1145, 2734
oker, N. Interpretation of the electron-inertia experiment for metals with positive Hall coefficients, 986. *See* Pugh, E. M., 8599
nberg, D. *See* Cowan, G. R., 8732; White, H. F., 7579
, L. and Taylor, W. E. Preparation of germanium single crystals, 1244*
, W. and Rich, S. R. A new method for continuous viscosity measurement. General theory of the Ultra-Viscoson, 6512
ischild, W. G. *See* Berstein, I. A., 8027
istein, J. Organization and entropy, 1600
ndi, L. *See* Mayburg, S., 8409
gardt, K. H. J. On the mechanism of the discoloration of alkali halide layers by cathode rays, 6311. On the diminution of luminescence as a result of electron irradiation, 8331
se, H., Baines, W. D. and Humphreys, H. W. Free convection over parallel sources of heat, 6705
se, J. L. *See* Parry, J. K., 6912
se, P. E., Jr. A theory of the linear viscoelastic properties of dilute solutions of coiling polymers, 6510
se, P. E., Jr, and Sittel, K. Viscoelastic properties of dilute polymer solutions, 5872
se, R. L. *See* Dowd, J. J., 4407
ssopoulos, P. Variational methods in the theory of collisions, 6474
vina, J. *See* Oxley, C. L., 7730
x, J. Change of dielectric constant on illumination ferro-electricity, and thermoluminescence in zinc oxide irradiated in the ultra-violet, 7583
land, P. R. Mechanism of electropolishing, 8017
land, R. E. Analysis of fluorescent X-radiation by means of proportional counters, 6076
lingson, J. S. The viscosity of heavy water vapour, 8272
linson, H. C. and Barrow, R. F. Absorption band-systems of SiO and GeO in the Schumann region, 4008. The band-spectrum of aluminium monofluoride, 4699. The absorption spectrum of aluminium monofluoride in the Schumann region, 7564
linson, J. S. *See* Cook, D., 7646
, D. J. Le. *See* Le Roy, D. J.
, K. S. *See* Krishnan, K. S., 4082
, L. Expansion of the universe and the cosmological field, 4558
, N. K. *See* Sirkar, S. C., 5973
, R. R. and Goes, M. L. Angular correlation of α-particle and conversion-electron from the decay of ionium, 8655
, R. R. and Groven, L. Investigations on positron-electron scattering, 1682
, S. K. *See* Krishnan, K. S., 1604
Royer, H. *See* Blottiau, F., 3964
Royer, L. On the epitaxis of crystals of anthraquinone and of urotropine on a cleavage plane of gypsum, 5197
Royon, J. *See* Bonnemay, M., 1215
Rozenfel'd, L. M. Methods of plotting entropy charts for the equilibrium phases of the water-ammonia solution, 5449. Thermodynamic theory of dynamic heating cycles [realized] with refrigerating machines, 6019. Theory of refrigerating machines having combined cycles, 6020
Rozental', I. L. The energy spectrum of the non-equilibrium soft component of cosmic rays, 5549. Cascade processes in extensive atmospheric showers of cosmic rays, 5555
Rozentsveig, L. N. *See* Lifshits, I. M., 5899
Rozhkovskiĭ, D. A. *See* Fesenkov, V. G., 5270
Rubin, R. J. The excluded volume effect in polymer chains and the analogous random walk problem, 1830
Rubinoff, M. *See* Leondes, C., 2142
Rubinow, S. I. *See* Feshbach, H., 627
Ruby, S. L. *See* Rustad, B. M., 3560
Rüchardt, H. Photochemical coloration of ammonium halides, 8322
Ruddick, J. J. *See* Buder, E. E., 7680
Ruderman, M. Nuclear forces from pseudoscalar meson theory, 3874. Pseudoscalar matrix element in beta-decay, 4317
Ruderman, M. A. The π^+ to π^- ratio from proton bombardment of deuterium, 1939. *See also* Henley, E. M., 5858
Rudge, A. J. *See* Banks, A. A., 4074
Rudick, L. *See* Ingle, G. W., 5986
Rudiger, O. *See* Houdlemont, E., 801
Rudik, A. *See* Ioffe, B., 5099
Rudik, A. P. *See* Ioffe, B. L., 2956, 3612–13
Rudloff, A. *See* Riezler, W., 1144
Rudman, P. S., Flinn, P. A. and Averbach, B. L. Measurements of clustering in solid Al-Zn alloys, 5731
Rudnick, I. *See* Medwin, H., 5345
Rudstam, G. and Svedberg, T. Use of tracers in chemical dosimetry, 5826
Rudstam, S. G. Spallation of vanadium, manganese, and cobalt with 187 MeV protons, 8681
Rueger, L. J. *See also* Nuckolls, R. G., 3135
Rueger, L. J. and Nuckolls, R. G. A broad-band, coaxial Stark cell for microwave spectroscopy, 728
Rüetschi, R. *See* Albers–Schönberg, H., 7103
Rühle, R. and Zehender, E. The assessment of objects in the electron microscope by rotating the specimen, 5134
Rumanova, I. M. *See* Belov, N. V., 7335
Rumer, Yu. B. Action as a co-ordinate of space. VI, 1362; VII, 2925. The field of a charged point-mass, 2940
Runciman, W. A. and Steward, E. G. The atomic position and size of the thallium ions in KCl(Tl) phosphors, 6656
Rundle, R. E. The structure and residual entropy of ice, 7014. The deuterium effect on hydrogen bond distances in crystals, 7291. *See also* Lewis, P. H., 6301
Rundle, R. E. and Parasol, M. O—H stretching frequencies in very short and possibly symmetrical hydrogen bonds, 1010
Rupert, C. S. A water-cooled carbon arc source for infrared spectroscopy, 107. Slit curvature in grating monochromators employing single or multiple diffraction, 112
Rush, J. H. and Sponer, H. Absorption studies of the vapors of the three isomeric picolines in the near ultra-violet, 1533
Rushbrooke, G. S. On the Born-Green theory of binary mixtures, 1421
Rushbrooke, G. S. and Scoins, H. I. On the theory of fluids, 3004
Rushworth, F. A. *See* Andrew, F. R., 316
Russek, J. *See* Friedman, B., 2562
Russell, B. R. *See* Miller, P. H., Jr, 535
Russell, K. E. and Simons, J. Studies in energy transfer. I. The combination of iodine atoms, 5614
Russell, L. A. *See* Stephenson, C. C., 6003
Russell, R. B. On the Zr-Hf system, 3243

Russell, R. D. *See* Collins, C. B., 2093, 3765

Russo, A. L. *See* Schwartz, D. S., 7522

Rust, H. H. Ultrasonic image conversion by means of a thermally induced colour change, 88. Explaining some chemical effects of ultrasonics, 514. Measurement of short time intervals, with particular application to distance measurement by sound echo methods, 8250. *See also* Bailitis, E., 6157

Rust, H. H. and Drubba, H. Practical application of the under-water spark as a source for echo sounding, 8300

Rustad, B. M. *See also* Wu, C. S., 412

Rustad, B. M. and Ruby, S. L. Correlation between electron and recoil nucleus in He^6 decay, 3560

Ruston, W. R. *See* Halla, F., 8056

Rutberg, R. A. The application of high-frequency sound waves to the processing of plasma, 8137

Rutgers, G. A. W. *See* ter Horst, D. T. J., 8431

Ruth, R. P. *See* Rank, D. H., 100

Rutherglen, J. G. and Smith, R. D. Excitation curves of the reactions $^{22}Al(p, \alpha)^{24}Mg$ and $^{27}Al(p, \gamma)^{28}Si$, 8678

Rutledge, G. P. *See* Davis, W., Jr, 6279

Rutter, J. W., and Chalmers, B. A prismatic substructure formed during solidification of metals, 2046

Rutzler, J. E., Jr. *See* Skinner, S., 4433

Ruyssen, R. and Maebe, J. The surface adsorption in solutions of sodium dodecyl sulphate, 8745

Rvachev, A. L. *See* Andrievskiĭ, A. I., 6798

Ryabinin, Yu. N. Super-high pressures and high temperatures obtained by the method of adiabatic compression, 5741. *See also* Karpenko, A. S., 5471

Ryabinin, Yu. N., Sobolev, N. N., Markevich, A. M. and Tamm, I. I. Optical properties of gases at high temperatures and super-high pressures, 5406

Ryder, E. J. Mobility of holes and electrons in high electric fields, 6044

Ryge, G. *See* Moffett, J. C., 549

Rymer, T. B. and Wright, K. H. R. A new determination of $h/\sqrt{(em_0)}$ by electron diffraction, 2485

Rysselberghe, P. Van. *See* Van Rysselberghe, P.

Rȳtov, S. M. *See* Leontovich, M. A., 5466

Rytz, A. *See* Astbury, J. P., 1931, 4384, 5718

Rȳvkin, S. M. Fundamental investigation of the effect of oxygen on the electric and photoelectric properties of the lead-sulphide photo-resistances, 6055

Rȳvkin, S. M. and Malakhov, L. N. Effect of oxygen on the conductivity and the photoconductivity of lead sulphide photoconductors, 7677

Rȳzhanov, S. G. On the paper by V. E. Golant "Vibration rotation spectra of atomic nuclei," 5040. Rotation levels and rotation spectra of heavy nuclei, 5670

Rzhevkin, S. N. A connection between the problem of sound diffraction upon a sphere and the theorem of reciprocity, 89

Rȳzhkova, K. P. *See* Azimov, S. A., 5714, 8497

Rzewuski, J. Differential conservation laws in non-local field theories, 8225. Relativistic quantum dynamics of a system of interacting particles, 8234

Saakyan, G. S. *See* Kocharyan, N. M., 5550

Sabatier, G. Measurement of heats of transformation by means of the differential thermal analysis, 195. A new X-ray camera for the study of back-reflections. Application to quartz, 8072

Sabbata, V. de. *See* de Sabbata, V.

Saby, J. S. and Dunlap, W. C., Jr. Impurity diffusion and space charge layers in "fused impurity" *p-n* junctions, 6049

Sacerdote, G. G. *See* Ferrero, M., 6573

Sachs, A. *See* Bodansky, D., 7167; Lindenfeld, P., 2740

Sachs, A. M. *See* Bodansky, D., 7168

Sachs, D. C. and Richardson, J. R. Mean excitation potentials, 4153

Sachs, M. Nuclear hyperfine structure of Mn^{++}, 6177

Sachs, R. G. *See* Brennan, J. G., 1127

Sack, R. A. Mean square radius of randomly coiled molecular chains, 3514. *See also* O'Dwyer, J. J., 1608

Sack, S. *See* McIntosh, J. S., 912

Sacks, F. M. and Fuoss, R. M. Ion association of 2–1 salts in methanol, 7240

Sadauskis, J. *See* Jesse, W. P., 291, 6118

Saeland, E. and Ehrenberg, L. A differential do metry of pile radiations using Fe^{2+} oxidatio 8743

Saenger, E. Detonation of liquid and solid explosiv 503. *See also* Sänger, E.

Saez, A. *See* Francon, M., 3206

Safford, R. *See* Bridge, H. S., 6122, 7178

Safronov, V. S. A possible source of the kinetic ener of interstellar matter, 7387

Sagane, R. Pion production ratios by proton bomba ment, 7170

Sage, B. H. *See* Reamer, H. H., 5887

Sage, M. *See* Guillaud, C., 8603; Kozakevitch, 8260

Sagot, M. *See* Valentin, F., 5487

Sahiar, A. B. *See* Astbury, J. P., 1931, 4384, 5718

Sailer, H. The ten general integrals of the equatio of motion in the mechanics of the special theory relativity, 8205

Sailor, V. L. The parameters for the slow neutr resonance in rhodium, 7151. *See also* Borst, L. 3624

Saint-Guily, B. Theoretical prediction of differen in the absorption-coefficients of pure water and s water, in the X-ray region, 880

St. Kröll, V. Vertical distribution of radium in dee sea sediments, 5794

Saitô, N. and Sugita, M. Energy dissipation and entro production in irreversible processes of dilute syste 1596

Saito, T. Absorption of diatomic gas by binary alloys. 3919

Sakai, M. and Hubert, P. Study of the radiation fr ^{65}Zn, 4990

Sakata, H., Matsuda, K. and Takeda, E. Therm concentration of carbon isotopes using carb monoxide gas, 6190

Sakellaridis, P. Emission and absorption *L*-spectra holmium (67), 5496. Emission and absorption spectra of gadolinium (64) and thulium (69), 54 *L* emission and absorption spectra of europium (and terbium (65), 5498. Energy levels and we emissions of the elements: Tm (69), Ho (67), Tb (6 Gd (64), Eu (63), 5499. Determination of the equ brium constant, *K*, in solution, 8010

Saker, E. W. The optical properties of liquid seleniu 106. Temperature-variation of the rectificati characteristics at selenium contacts, 4094

Sakihama, K. and Takagi, S. Nucleonic components high altitudes, 300

Saksena, B. D. and Pant, L. M. Raman spectrum a cathodo-luminescence spectrum of aluminium ph phate, 7596

Sakurai, K. Some remarks on the relation between Harker-Kasper inequality and the Okaya-Ni linear inequalities, 545

Sakurai, T. and Munesue, S. Resistivity of evapora tellurium films, 4084

Salam, A. Modified propagation functions in pert bation theory, 8239

Salam, A. and Matthews, P. T. Fredholm theory scattering in a given time-dependent field, 4615

Salam, S. A *See* Mansfield, R., 6768

Salant, E. O. *See* Blau, M., 1102

Salecker, H. On the nature of the mass and charge electrons, 1366. On the theory of scattering electrons by electrons, 3357

Salikhov, S. G. *See* Al'tshuler, S. A., 5568. Kozyr B. M., 3431

Salisbury, W. W. *See* Papas, C. H., 2561

Salka, O. *See* Norinder, H., 3328

Salley, D. J. *See* Hirt, R. C., 6630

Salli, I. V. Theory of decomposition of the sup saturated [solid] solutions, 8045

Salmon, A. J. and Inall, E. K. The angular correlat of the protons and γ-radiation from the react $^6Li(d, p)^7 Li^*\gamma\ ^7Li$, 3594

Salmon, J. *See* Detœuf, J.-F., 5683

Salmon, P. G. *See* Sharpe, J., 4877

Salomonovich, A. E. Automodulation at fe resonance, 977

Saloom, J. A., Jr. On the causes of "spontaneo oscillations in gaseous discharges, 4224

ETER, E. E. Nuclear reactions in the stars. I. Proton-proton chain, 588. The Lamb shift for hydrogen and deuterium, 1849. The reaction rate of the proton-proton chain, 4577. Repulsive core and charge independence, 8238. *See also* BARANGER, M., 606; BUTLER, S. T., 442
ETER, E. E. and GOLDSTEIN, J. S. Momentum space wave functions. II. The deuteron ground state, 5866
BURG, Z. W. and KIRKWOOD, J. G. The free volume theory of multi-component fluid mixtures, 67
BURG, Z. W., ZWANZIG, R. W. and KIRKWOOD, J. G. Molecular distribution functions in a one-dimensional fluid, 5904
ER, D. C. *See* DICKSON, J. M., 1703, 6858, 7189
ER, L. *See* DOMB, C., 2056
MAN, W. M. and NACHTRIEB, N. H. The electrochemistry of gallium, 5755
ZBERG, B. *See* COHN, G. I., 2894
ETTI, C. *See* GALLONE, S., 7834
ETTI, O. *See* SCROCCO, E., 2892
INI, G. and KIM, Y. B. Production cross section and frequency of neutral mesons in cosmic rays, 301
BERG, H. W. and SCHULDINER, S. Calculation of the concentration of atomic hydrogen at a cathode, 510
MAN, C. F., JR. *See* STAMM, R. F., 2326–7, 7554
JEL, A. H. and MAGEE, J. L. Theory of radiation chemistry. II. Track effects in radiolysis of water, 6298
CHEZ DEL RÍO Y SIERRA, C. and TELEGDI, V. L. Inelastic nuclear scattering of photons by Rh^{103}, 5073
DAGE, A. R. and SCHWARZSCHILD, M. Inhomogeneous stellar models. II. Models with exhausted cores in gravitational contraction, 3833
DERS, C. L. and MIDDLETON, E. E. K. The absolute spectral diffuse reflectance of magnesium oxide in the near infrared, 2362
DERS, L. G. *See* BEGHIAN, L. E., 7076; HICKS, D., 5058
DERS, T. M., JR. *See also* DOUSMANIS, G. C., 8622
DERS, T. M., JR, SCHAWLOW, A. L., DOUSMANIS, G. C. and TOWNES, C. H. A microwave spectrum of the free OH radical, 4022
DERSON, M. J. and BAENZIGER, N. C. The crystal structure of $BaCd_{11}$, 8099
DERSON, R. T. On the nature of the hydrogen bridge, 5183. The charge on combining hydrogen atoms, 7257
DIFORD, P. J. *See* WELSH, H. L., 135
DLER, N. I. A rapid (fine-focus) X-ray tube for back-reflection photographs and its application at normal and high temperatures, 2067
DORFY, C. Theories of electronic spectra of organic molecules, 5621
GER, E. On the physics of detonation of solid and liquid explosives, 5154. *See also* SAENGER, E.
T'ANA-DIONISIO, J. *See* BASTIN-SCOFFIER, G., 5008
TEN, J. H. VAN. *See* VAN SANTEN, J. H.
TOS LUCAS, J. Anthracene studied by the molecular orbital method, configuration-interaction being taken into account. The fundamental configuration, 1015
RTE, R. *See* FERT, C., 2487
ABHAI, V., DESAI, U. D. and KANE, R. P. Daily variation of meson intensity and its possible solar origin, 4190
ABHAI, V. and KANE, R. P. World-wide effects of continuous emission of cosmic rays from the sun, 4192. Effects at Godhavn and lower latitudes of changes in energy and composition of solar cosmic rays, 7764
D, R. D. *See* ALTHAUS, E. J., 6927; BARKER, K. H., 4196
DOS, R. Study of the dispersion of birefringence of cellophane in the visible spectrum, 7618
GENT, B. W., YAFFE, L. and GRAY, A. P. Measurement of the half-lives of AcC″, Cu^{66}, Mg^{27}, Ti^{51}, Tl^{206}, and V^{52}, 2651
MA, K. S. *See* RAO, K. N., 6414
NA, H. R. and TREHAN, P. N. Some measurements on the dielectric polarisation of alcohol mixtures, 3288
SAROLÉA, I. On the influence of nonrandomness of mixing in the cell model of solutions, 3010
SAROLÉA, L. Influence of volume changes and lattice vibrations in order-disorder transitions, 8773
SARTAIN, C. C. *See* ROBERTS, L. D., 8385
SARTORY, M. *See* BARLOUTAUD, R., 7072
SARTRE, L. The spirit of geometry in electromagnetism and in electrical engineering, 5578. Electric induction in polarized matter, 6150
SASADA, Y. and ATOJI, M. Crystal structure and lattice energy of orthorhombic hexachloroethane, 2087
SASAKI, K. *See* KINUMAKI, S., 4085; MATSUZAKI, Y., 3619
SASAKI, T. On the solution of trans-sonic flow using Laplace transformation, 1434
SASMOR, D. J. *See* DWORKIN, A. S., 6015
SASTRI, M. L. N. *See also* RAMAKRISHNA RÁO, V., 150
SASTRI, M. L. N. and SPONER, H. Fluorescence studies of some simple benzene derivatives in the near ultraviolet. III. Benzotrifluoride, 149
SATO, H. Experimental study of the spectrum of isotropic turbulence. III, 2254
SATO, I. *See* NAKABAYASI, K., 54
SATÔ, M. *See* HONDA, K., 1577–9
SATO, R. Electron diffraction investigation of the actions of aqueous heavy metal salts on mineral surfaces. I. Action of silver nitrate and sulfate on sphalerite cleavage face, 4470; II. Action of mercuric sulfate on galena cleavage face, 8719
SATOMURA, S. and ISHIGURO, M. Frequency characteristics of the negative resistance in the Ge-rectifier, 856
SATCHELOR, G. R. and SPIERS, J. A. Angular distribution of γ-radiation following a deuteron stripping reaction, 2695
SATCHLER, G. R. Angular-distribution of γ-rays from stripping reactions, 6210
SATTEN, R. A. An "algebra" of possibilities relating regions in object and image space for a system of thin lenses, 1484. Analysis of the spectrum of the Nd^{+++} ion in the bromate crystal, 4004
SATTERFIELD, J. H. *See* GUYTON, A. C., 1304
SATTERLY, J. Rocking experiment with two degrees of freedom, 3889
SAUER, J. A. *See* HSIAO, C. C., 7998
SAUNDERS, D. F. *See* DANIELS, F., 5415
SAUNDERS, F. A. Recent work on violins, 5349
SAUNDERS, J. W., JR. *See* O'BRIEN, J. P., 8824
SAUNDERS, O. A. *See* ANDERSON, J. T., 6704
SAUREL, J. R. Apparatus for the rapid experimental study of the equations of state of gases at high temperatures, 5330
SAUVENIER, H. *See* HAUTOT, A., 2119–20, 5266, 6351
SAVAGE, R. L. *See* SKINNER, S. M., 4433
SAVINOV, G. V. Self-oscillations in essentially non-linear quasi-conservative systems, 7519
SAVORNIN, F. *See* SAVORNIN, J., 244, 5484
SAVORNIN, J. and SAVORNIN, F. Thermo-electric measurements on *p*-type silicon, 244. Measurement of thermoelectric power for very small differences of temperature, 5484
SAWADA, H. Statistical study of the Barkhausen effect. I. Distribution of domain size, 1760; II. Relation between domain size and internal stress, 1761; III. Distribution of time interval, 1762
SAWADA, K. On the interaction of cohesive field, 36. Note on some type of interaction, 37. On the model of *V*-particle and meson-nucleon scattering, 4379
SAWADA, S. Thermal and electrical properties and crystal structure of tungsten oxide at high temperatures, 8796
SAWYER, G. A. Unbacked thin films, 1178
SAWYER, R. A. *See* WAHR, J. C., 3096
SAWYER, W. M. *See* FOWKES, F. M., 63
SAXENA, A. P., BHATAWDEKAR, M. G. and RAMAIAH, N. A. Photoionization as an important secondary process in a low frequency electrodeless discharge, 3331. Langmuir adsorption as a determinant of conductivity in a low-frequency electric discharge, 7698
SAXENA, A. P. and RAMAIAH, N. A. Limitations of surface layer theories of Joshi-effect—a review, 7699
SAXTON, J. A. and LANE, J. A. Electrical properties of sea water, 833

Saxton, R. L. and Drickamer, H. G. Diffusion in liquid sulfur, 7496
Sayce, L. A. *See* Hall, R. G. N., 2389
Sayers, D. and Carroll, P. K. The wavelengths of nitrogen First Positive bands, 8316
Sayre, D. The double Patterson function, 8793
Scaife, B. K. P. The reaction field of a noncentral dipole, 6165
Scanlan, J. *See* Moffitt, W., 7015
Scanlon, J. C. *See* Oliver, N. J., 8818
Scanlon, J. P. *See* Green, L. L., 8682
Scanlon, W. W. *See* Humphrey, J. N., 4093; Talley, R. M., 1663
Scarf, H. *See* Brucer, M., 4536
Scarsi, L. *See* Baroni, G., 8485; Dilworth, C., 7120
Scarsvåg, K. *See* Lundby, A., 5539
Schaal, A. X-ray stress-measurement method, with examples of application, 7202
Schachenmeier, R. and Weller, F. Refractive index of dipolar gas mixtures at decimeter wavelengths, 6031
Schachinger, L. *See* Clusius, K., 6014
Schachman, H. K. *See* Pickels, E. G., 2790
Schadt, C. *See* Cadle, R. D., 3675
Schaefer, C. *See also* v. Fragstein, C., 7541
Schaefer, C. and Dransfeld, K. The determination of the ratio p/q of the photoelastic constants of optical glasses by a dynamic method, 3193
Schaefer, C. and Eberle, J. Alteration of the relative brightnesses of colours by neodymium filters, 8349
Schaefer, C. and Nassenstein, H. Determination of the photoelastic constants p and q of optical glasses, 3192
Schaetti, N. and Baumgartner, W. On the problem of dark currents in photomultipliers, 6790
Schäfer, H. and Niklas, A. The miscibility break in the barium/barium chloride system, 1423
Schäfer, K. and Riggert, K. H. A new method of determining the partial thermal coefficient of accommodation, 6018
Schäfer, K. and Staab, K. Mechanism of the influence of [impurities on] line intensity in flame photometry, 727
Schäfer, K. and Wolff, H. The line shift and heat of mixing of solutions of acetone with saturated hydrocarbons, 6017
Schafroth, M. R. Coulomb interaction and the Meissner-Ochsenfeld effect, 2464
Schall, R. Flash X-ray investigations on non-ideal detonation waves, 2005
Schallamach, A. The velocity and temperature dependence of rubber friction, 7224
Schardin, H. The multiple spark camera and its use in technical physics, 6371
Schardt, A. W. *See* Bernstein, W., 6113
Scharff-Goldhaber, G. Excited states of even-even nuclei, 4962, 5649
Scharmann, A. *See* Hanle, W., 3153
Scharowsky, E. Optical and electrical properties of ZnO single crystals with excess Zn, 6782
Schatzman, E. The internal temperature of white dwarfs, 3835. The existence of a maximum in the luminosity function, 5283. Remarks on Kuiper's cosmogony, 6388. The structure and evolution of cometary nuclei, 6403. On certain nuclear reactions of astrophysical importance. IV. Sensitivity of thermonuclear reactions, 6438
Schauenstein, E. *See* Kratky, O., 1180
Schawlow, A. L. *See* Sanders, T. M., Jr, 4022
Schecter, L., Crandall, W. E., Millburn, G. P., Hicks, D. A. and Shelton, A. V. The high energy charged particles from targets bombarded by 190-MeV deuterons, 5065
Scheibe, G. and Fauss, R. Ultra-violet absorption by high polymers, 4024
Scheibe, G. and Zanker, V. The Franck-Condon principle in spectra of associated dyes, 1523
Scheidegger, A. E. Gravitational motion, 7421. *See also* Krotkov, R. V., 2185
Scheidegger, A. E. and Krotkov, R. V. Relativistic statistical thermodynamics, 2964
Schein, M. *See also* Backus, M., 1940; Glasser, R. G., 4336
Schein, M., Fainberg, J., Haskin, D. M. and Glas
R. G. Production of high-energy electron pairs negative pions in nuclear collisions, 7909
Scheirer, C. L., Jr. *See* Simons, J. H., 2224
Schelling, H. von. *See* von Schelling, H.
Schenck, H., Jr. Physics and physiology in diving
compression, 4525
Schenck, J. Neutron-detecting phosphors, 281. A
vation of lithium iodide by europium, 4026. *See*
Prins, J. A., 2398; van der Does de Bye, J. A.
2404
Schepers, J. *See* van Itterbeek, A., 7685
Scheraga, H. A. *See* Anderson, H. R., Jr, 8024
Scherr, C. W. On the use of a single scale facto
atomic wave functions. I, 7048; II. Application
overlap integrals, 7049. Free-electron netw
model for conjugated systems. IV, 8626
Scherrer, P. *See* Albers-Schönberg, H., 50
Erdös, P., 7136; Humbel, F., 4789; Meier, R., 8
Scherrer, V. E., Smith, W. L., Allison, B. A.
Faust, W. R. Gamma radiation from inela
scattering of 2·7 MeV neutrons, 8687
Scherrer, V. E., Theus, R. and Faust, W. R. Gamm
radiation from interaction of 14-MeV neutrons
iron, 4365
Scherrer, W. Action principles for the field theor
matter, 6455*
Scheuble, W. Sorption properties of thin nickel fi
8747
Schier, H. Physical illumination photometer
photomultiplier cell, 6593
Schiess, J. Photometric sensitivity in steady c
parison photometry of spectral lights at dayl
levels, 6591. Comparison of photometric meas
ments on spectral lights by the flicker and equal
of-brightness methods under light adaptation, 65
Schiff, D. and Metzger, F. R. Gamma-gam
directional correlations in Co^{59}, Xe^{131}, and Hg
6213
Schiff, H. *See* Jackson, J. D., 2515
Schiff, L. I. Quantum effects in the radiation f
accelerated relativistic electrons, 882. *See*
Motz, H., 4144
Schiller, R. *See* Bergmann, P. G., 2177
Schilling, H. K. *See* Nyborg, W. L., 2281
Schilling, P. *See* Lochte-Holtgreven, W., 8428
Schindler, A. I. and Pugh, E. M. The Hall effec
copper nickel alloys, 1794
Schirmer, H. *See* Larché, K., 875
Schiske, P. An electrostatic single lens permit
rigorous calculation, 4137
Schlacks, L. K. *See* Brolley, J. E., Jr, 1134
Schlegel, E. S. *See* Robinson, S. A., 1240
Schleicher, H. *See* Leo, W., 6587
Schleicher, H.-W. Observations on Fe points in
field electron microscope, 1182
Schlicke, H. M. Quasi-degenerated modes in hig
dielectric cavities, 3448
Schliebs, G. The principles of programming a ca
lating machine to play chess, 6380
Schlieder, S. *See* Meyer, P., 8668
Schlögl, F. Excitation of nuclear dipole oscillation
fast electrons, 1902
Schlomka, T. On the representation of physical
geometric quantities by world tensors of ra
1 and 2, 2930
Schluge, H. *See* Rang, O., 1186
Schlüter, A. Connection between the modes of vi
tion of a plasma, 3324. Plasma in a magnetic fi
3324
Schlyter, K. On the crystal structure of fluorides of
tysonite or LaF_3 type, 2822
Schmeiser, K. *See* Koester, L., 1872, 6089*
Schmeissner, F. *See* Meissner, W., 1646, 6794
Schmelzer, C. On the optimum adjustments of
electron cyclotron, 2480
Schmidli, B. The flow double refraction and visc
of concentrated solutions of high polymers, 5316
Schmidt, E. Avoiding the guard ring in heat con
tivity measurements in plate-shaped bodies, 1
See also Nöske, H., 3332
Schmidt, H. A simple derivation of the distribu
functions for Bose and Fermi statistics, 5868
Schmidt, I. Effect of illumination in testing color vi
with pseudo-isochromatic plates, 2108

MIDT, K. Experimental investigation of the Ranque vortex tube, 808
MIDT, W. *See* MOSER, H., 6601
MILLEN, A. Decay time measurements on liquid and solid solutions with a new fluorometer, 6650
MILLEN, A., SCHMILLEN, L. and ROHDE, F. On the decay time of solid solutions of aromatic hydrocarbons, 5969
MILLEN, L. *See* SCHMILLEN, A., 5969
MITT, R. A. and SUGARMAN, N. Uranium photofission yields, 4357
NABLE, G. L. *See* HAZEL, J. F., 3162
NEEBELI, G. and HUARD DE LA MARRE, P. Method of practical solution of problems of non-permanent filtration flows with a free surface, 6513
NEIDER, E. E. Techniques and ultimate sensitivity in microwave spectroscopy, 124
NEIDER, F. On the interpretation of extremely low burning voltages of high frequency discharges between plane plates, 6068
NEIDER, P. J. Numerical method for porous heat sources, 3233
NEIDER, P. J. and CAMBEL, A. B. Membrane apparatus for analogic experiments, 6381
NEIDER, W. and MATITSCH, T. A photographic method for the quantitative estimation of actinium, 4975
NEIDER, W. G. *See* CHYNOWETH, A. G., 676; WEINBERGER, M. A., 3244–5
NELLE, P. D. *See* JOHNSEN, S. E. J., 2315
NEPP, O. and MCCLURE, D. S. Symmetry assignments for the first two excited singlet electronic states of the naphthalene molecule, 7003
ODDER, G. R. *See* MEYER, E., 5936
OENFELD-REINER, R. *See* LAX-WEINER, K., 1197
OENING, F. R. L. *See* VAN NIEKERK, J. N., 2086, 8113
OENWETTER, H. K. An improved fast scaler, 6894
OLES, G. *See* RIGG, T., 3687
OLES, W. E. *See* PARKIN, P. H., 3074
OLL, H. and RÖHM, F. On distortion by compression of long crystals. 6267
OLZ, O. *See* KLUMB, H., 5900
IOLZ, S. *See* BECKER, E. W., 2628
IOMAKER, V. *See* DUNITZ, J. D., 1017–18; GLAUBER, R., 2837
IÖNBERG, M. Ionization loss at relativistic energies and polarization effects, 2492. Application of second quantization methods to the classical statistical mechanics, 7470; II, 8221. A general theory of the second quantization methods, 8220. *See also* HUYBRECHTS, M., 8451
IONEBAUM, R. C. Conductance in non-aqueous solutions, 231
IÖNHEIT, E. *See* MIELENZ, K.-D., 6509
IOPPER, H. The production of linearly polarized light with the aid of a thin absorbing layer, 4746. On the interpretation of the optical constants of the alkali metals, 8395
IOTT, G. L. and MEINKE, W. W. Assignment of Y^{92} and Y^{94}, 4303
IRADER, C. D., NELSON, E. B. and JACOBS, J. A. The angular correlation of the cascade gamma-rays from the decay of Au^{198}, 5030
IRADER, R., SIMON, A. and ACKERMANN, G. Investigations on magnetic recording media, 8581
IRAG, R. L. *See* GIBBONS, J. J., 1786, 4234
IREUER, E. The thermal damping of elastic vibrations, 5929. The internal damping of an initially stressed medium, 8299
IRIEVER, W. Sound ranging in a medium having an unknown constant phase velocity, 3075
IRÖDINGER, E. Relativistic Fourier reciprocity and the elementary masses, 599
IROEDER, H. P. *See* HARRIS, S. P., 7186*
HUBART, G. *See* BLANKENBURG, G., 8402
HUBERT, G. V. *See* KÖNIG, L. A., 6060
HUBERT, K. Positional relationship of valency electrons in crystal chemistry, 3729. On the span correlation of the outer electrons in crystal chemistry, 8057
HUBERT, K. and ANDERKO, K. Crystal structures of Pd_2Si, Pt_2Si, Pd_2Ge and Pt_2Ge, 552
SCHUBERT, K., ANDERKO, K., KLUGE, M., BEESKOW, H., ILSCHNER, M., DORRE, E. and ESSLINGER, P. Structure determination of the alloy phases Cu_2Te, CuTe, Cu_3Sb, InTe, Bi_2Se_3, Pd_5Sb_3 and Pd_5Bi_3, 8097
SCHUCHMANN, J. A. *See* DALITZ, V. C., 5732
SCHUHKNECHT, W. Contribution to the methods and technique of flame spectrography and flame photometry. I, 7549; II, 7550
SCHULDINER, S. Hydrogen overvoltage on bright platinum, 7248. *See also* SALZBERG, H. W., 510
SCHÜLER, H. On a new spectrum attributed to the C_2H_x molecule ($x = 1, 2$ or 3), 6417
SCHÜLER, H. and DEGENHART, V. On chemical reactions caused by electron excitation in the positive columns of glow discharges (toluol, benzol and ammonia), 3334. On the production of hydrazin and ammonia in glow discharges, 6823
SCHÜLER, H. and REINEBECK, L. Behaviour of chlorobenzene during a glow discharge, 737
SCHULER, R. H. *See* HUNT, R. A., 3726
SCHULKES, J. A. *See* GORTER, E. W., 4908
SCHULMAN, J. H. *See also* KLICK, C. C., 770
SCHULMAN, J. H., GINTHER, R. J. and CLAFFY, E. W. Note on the properties of calcium silicate phosphors, 4029
SCHULMAN, J. H., GINTHER, R. J. and KIRK, R. D. Enhancement of X-ray induced absorption bands in alkaline earth compounds, 1538
SCHULMAN, J. H. and KLICK, C. C. An apparatus for automatic recording of reflection spectra, 5944
SCHULTE, H. J. *See* CAMAC, M., 1020
SCHULTZ, H. *See* JUSTI, E., 4814
SCHULTZ, W. B. *See* FLORY, P. J., 2986
SCHULTZ, W. W. and DEWES, R. A. Photovoltaic radiation detector, 6831
SCHULTZ-GRUNOW, F. The similarity law of flame-propagation, 6004
SCHULZ, A. G. *See* JAKOBSON, M. J., 7955
SCHULZ, G. *See* KUNZE, P., 4156
SCHULZ, G. V. *See also* VON GÜNNER, K., 6304
SCHULZ, G. V., BODMANN, O. and CANTON, H.-J. A new highly sensitive differential refractometer, 3089
SCHULZ, K. *See* SUHRMANN, R., 6300
SCHULZ, L. G. Optical properties of bismuth in the near infrared, 5967
SCHULZE, A. and EICKE, H. On gold-chromium resistance standards, 6769
SCHULZE-PILLOT, G. *See* KOESTER, L., 1872
SCHUMACHER, B. Dynamic pressure stage elements for projecting intense monokinetic corpuscular rays into gases at high pressure, 4830
SCHUMANN, T. Behaviour of atmospheric pressure systems, 2846
SCHUMANN, W. O. On the propagation of very long electric waves and the wave spectrum of the lightning discharge, 1787. On the propagation along the earth's surface of very long electric waves and the lightning discharge, 6155
SCHUSTER, K. *See* MEIER, R., 4792
SCHWABE, E. Theoretical discussion of the influence on the coercive force of spheroidal inclusions of size small compared with the width of the Bloch wall, 1744
SCHWAN, H. P. *See* CARSTENSEN, E. L., 3040
SCHWARCZ, L. *See* ANDERSON, H. L., 1685
SCHWARTZ, C. M. *See* COCKS, G. G., 790
SCHWARTZ, D. S. and RUSSO, A. L. Schlieren photographs of sound fields, 7522
SCHWARTZ, H. The photosensitivity of glass self-quenching Geiger counters with external cathode, 6875
SCHWARTZ, H. M. Atomic excitation in beta-decay, 1892. Magnetic moments of odd-odd nuclei and the strong spin-orbit coupling shell model, 4283
SCHWARTZ, N. *See* KRUMHANSL, J. A., 4477
SCHWARTZ, R. B., PERLMAN, M. L. and BERNSTEIN, W. Radiations from Rb^{86} and Rb^{86m}, 7873
SCHWARTZ, R. N., SLAWSKY, Z. I. and HERZFELD, K. F. Calculation of vibrational relaxation times in gases, 348
SCHWARZ, G. *See* BROWN, L. C., 537; ROGOSA, G. L., 7301
SCHWARZ, G. S. *See* GILARDONI, A., 4546

Schwarz, H. On the photosensitivity of glass self-quenching Geiger-Müller counters with external cathode, 2504. Methods of obtaining high vacuum by ionization. Construction of an "electronic pump," 5897

Schwarz, R. J. *See* Miller, K. S., 8586

Schwarzl, F. and Staverman, A. J. Higher approximations of relaxation spectra, 3644

Schwarzschild, M. Theoretical aspects of stellar evolution, 6437. *See also* Frenkiel, F. N., 3808; Oke, J. B., 3832; Sandage, A. R., 3833

Schwarzschild, M. and Spitzer, L., Jr. On the evolution of stars and chemical elements in the early phases of a galaxy, 6385

Schwed, P. and Groetzinger, G. A statistical theory of order-disorder equilibrium at high temperatures, 6158

Schweiger, R. N. A direct current microampere integrator, 1628

Schwertz, F. A. and Mazenko, J. J. Nonlinear semiconductor resistors, 8415

Schwesinger, G. Reducing aberrations in rotating-prism compensators for nonintermittent motion pictures, 1486*

Schwetman, H. D. and Brown, S. L. The application of the Laplace transformation and a mechanical harmonic synthesizer in the analysis of electric circuits, 6382

Schwinger, J. The theory of quantized fields, II, 7430; III, 7431. A note on the quantum dynamical principle, 8213

Sciama, D. W. *See* Bell, D. G., 4241

Sciuti, S. *See* Amaldi, E., 4194, 7781

Scoins, H. I. *See* Rushbrooke, G. S., 3004

Scolnik, R. *See* Koomen, M., 2109

Scorer, R. S. Air motion in the upper atmosphere, 8124

Scott, A. F. and Bettman, M. A comparison of the chemical and physical atomic weight values of the monoisotopic elements, 392

Scott, E. L. *See* Neyman, J., 2155, 3825

Scott, G. D. *See* Sennett, R. S., 143, 7972

Scott, G. G. The gyromagnetic ratio of Supermalloy, 2552

Scott, H. H. and von Recklinghausen, D. A compact, versatile filter-type sound analyzer, 5932

Scott, J. C. W. The polarization ellipse in the ionosphere, 3464

Scott, J. R. Instruments for measuring plasticity in the rubber industry, 5142

Scott, K. W. and Stein, R. S. A molecular theory of stress relaxation in polymeric media, 6984

Scott, M. B. *See* Goldschmidt-Clermont, Y., 2712

Scott, R. B. *See* Armstrong, G. T., 7626

Scott, R. L. Second-order transitions and critical phenomena, 2407. *See also* Hildebrand, J. H., 66

Scott, W. E. *See* Lindner, L., 2319

Scott Blair, G. W. *See* Blair, G. W. Scott

Scovil, G. W. The Hall effect in titanium, 3469

Scovil, H. E. D. *See also* Bleaney, B., 1750–1; Bogle, G. S., 378

Scovil, H. E. D., and Stevens, K. W. H. The "extra" levels in rare earth salts, 2337

Scrocco, E. and Salvetti, O. Study of the exchange integral and research on the approximate formulae for some integrals appearing in problems of molecular structure, 2892

Seaborg, G. T. Activation energy for fission, 1924. *See also* Hollander, J. M., 7061

Searcy, A. W. The vapor pressure of germanium, 3238

Seaton, M. J. The Hartree–Fock equations for continuous states with applications to electron excitation of the ground figuration terms of O-I, 3533. Electron excitation of forbidden lines occurring in gaseous nebulae, 7045. *See also* Erskine, G. A., 3880

Sebba, F., and Sutin, N. A new apparatus for studying the evaporation of water through monolayers, 2795

Sébilleau, F. *See* Guinier, A., 1255

Seed, J. Angular correlations in the reaction $^{23}\mathrm{Na}(p, \alpha\gamma)^{20}\mathrm{Ne}$, 8675

Seed, J. and French, A. P. Angular correlations in the reaction $\mathrm{F}^{19}(p, \alpha\gamma)\mathrm{O}^{16}$, 1110. Angular correlations in the reaction $^{15}\mathrm{N}(p, \alpha\gamma)^{12}\mathrm{C}$, 3576

Seeger, A. Ionic movements in crystals, 3722; II, 729 Diffusion problems associated with the growth crystals from dilute solution, 4466

Seeger, A., Donth, H. and Kochendörfer, A. Th theory of dislocations in one-dimensional rows atoms. III. Dislocations, proper motions and the interactions, 6268

Seeger, K. Electron emission from metals as an aft effect of irradiation, 8482

Seeger, R. J. On fluid dynamics in physics teaching, 222 *See also* Ludford, G., 3902

Seeliger, R. Investigations in the field of gas dischar physics, 3336. Adjustment of spherically correct electron optical systems, 4847

Seemann, H. E. *See* Splettstosser, H. R., 2126

Ségal, J. The absorption of red light by dyes and occurrence in vision, 4532

Segall, B. *See* Blair, J. S., 620

Ségard, N. Contribution to the theoretical study of t diffraction pattern given by a circular aperture ha covered by a plane parallel plate, 3183

Segrè, E. The problem of the stability of technetiu 7864. *See also* Bernardini, G., 5075; Cortini, G 7780

Seidel, P. *See* Chomse, H., 8333

Seidel, W. Bibliography of numerical methods conformal mapping, 2891

Seiden, J. On the elimination of alignment defects the cosmotron with strong convergence, 6092. *S also* Hubert, P., 4839

Seidlitz, L. *See* Gailar, O., 2882

Seifert, A. M. *See* Bramson, H. J., 472

Seigel, R. *See* Leipuner, L., 7115

Seiler, K. *See also* Dürr, W., 4090; Geist, D., 230

Seiler, K., Geist, D., Keller, K. and Blank, K. there a thermal disordering process with germanium 6041

Seippel, O. *See* Glättli, H., 5069

Seith, W. and Kottmann, A. Diffusion in metals solid state, 3631

Seitz, F. The plasticity of silicon and germanium, 119 Generation of *F*-centers at low temperature, 5171

Seitzer, W. H. *See* Goeckermann, R. H., 1065

Seki, Y. A new type of striation observed in electro micrographs of sericite, 4489

Sekido, Y. and Yagi, T. Deflection of cosmic rays the solar magnetic field, 8500

Sekiguchi, N. Effects of the short period oceanic tid on the rotation of the earth, 3842

Sekora, A. *See* Kratky, O., 1180

Seldam, C. A. ten. *See* ten Seldam, C. A.

Selényi, P. Production of photographic pictures selenium by crystallization under the action of lig 2873

Seliger, H. H. The backscattering of positrons a electrons, 265. *See also* Smith, C. C., 6107

Seliger, H. H., Cavallo, L. and Culpepper, S. V. T half-life of I^{131}, 4986

Seligman, H. and Putman, J. L. British standard radioactive iodine ($^{131}\mathrm{I}$), 1045

Sel'kin, V. A. *See* Gross, E. F., 3166; Korshun A. V., 5407

Sellers, P. A. *See* Elson, R., 4367

Sells, R. L., Harris, C. W. and Guth, E. The p distribution function for a one-dimensional gas, 82

Selzer, E. Semi-local, unstable manifestations terrestrial magnetism, 4493

Seman, O. I. Aberrations of electron optical syste with charged surfaces in the refracting region, 6085

Semenov, A. S. *See* Veshev, A. V., 5791

Sen, H. K. Solar "enhanced radiation" and plas oscillations, 583. An estimate of the density a motion of solar material from observed chara teristics of solar radio outbursts, 3805

Sen, R. K. Thermal diffuse scattering of X-rays fr single crystals of benzil, 3750

Senftleben, H. A simple method for the simultaneo determination of the specific heat, coefficient viscosity and thermal conductivity of gases, 58 Heat transfer in liquids under the action of elect fields, 5998

Sengupta, N. D. On the solution of the equation electron in the field of electromagnetic radiation, 74

Sen Gupta, P. K. Superior mirage of lightning strea 1290 upta, S. α-Energy systematics and proton shells or heavier nuclei, 373. On closed proton shells in uclei of atomic number less than fifty, 4271. Non-xistence of stable isobars with odd mass number, 959. A systematic of α-energies, 6179

r, D. A. and Grove-Palmer, C. O. J. An improved echnique for high-speed photography, 1324

r, T. B. A. The diffraction of a dipole field by a erfectly conducting half-plane, 7801

ett, R. S., McLauchlan, T. A. and Scott, G. D. lectron microscope studies of evaporated cadmium nd zinc, 7972

ett, R. S. and Scott, G. D. The structure of vaporated metal films, 143

ney, C. A. *See* Hartman, R. E., 2762

, F. R. *See* Witnauer, L. P., 2033

er, A. On the resolving power of the electrostatic mmersion objective, 896. An electrostatic immersion objective with high voltage resolving power, of a new type, 897. Calculation of the potential distribution on the axis of an electrostatic immersion objective with thick electrodes, 1677. Experimental study of the electrostatic immersion objective with plane electrodes: focusing curves and focal distance, 3348. An experimental study of the electrostatic immersion objective with plane electrodes: extracting field E_0 under focusing conditions; geometrical aberrations outside the axis, 3349

esse, S. Electrolysis experiments confirming the nversion of the Hittorf phenomenon, 8018

uys, M. On the transition through sonic velocity n the efflux of a burning gas, 1433. Possibility of relating a gaseous flow with heat production or chemical reaction to an isotropic flow without chemical reaction, 6544

ant, R. Note on the Cotton effect, 4025

ant, R. and Loudette, P. First results of a polarimetric study, with microwaves, of asymmetric metal resonators, 5583

, D. Ultrasonic absorption in liquid mixtures and structural effects, 3950. *See also* Litovitz, T. A., 1456

, D., Busala, A. and Hubbard, J. C. Energy transfer by collisions in *cis*- and *trans*-dichloroethylene vapors, 1457

, R. L. and Tomasini, G. Slow heavy mesons from cosmic ray stars, 8505

on, R. Heat evolved during the reaction between carbon monoxide and caesium, 8005

y, P. S. V. *See* Khastgir, S. R., 254, 1656, 4125, 4822

rin, H. Optical methods for the calculation of diffraction patterns in the region of centimetre waves, 4923

ell, J. R. *See* Dowling, P. H., 3172

, T. On the concept of the effective range in the theory of the scattering of nucleons on nuclei, 2195. A differential equation for the Fermi scattering lengths in neutron-proton scattering, 4618. *See also* Herrmann, J., 5010

iour, E. F. W. Nuclear magnetic resonance line width transition in aluminium, 3432. *See also* Croft, A. J., 4105

iour, F. D. *See* Harrison, G. E., 2718

ole, O. W. *See* Gilford, S. R., 8821

er, K. D. *See* Cook, L. G.

iat, M. The crystal and molecular structure of maleic acid, 7337

n, G. A. and Gaze, V. F. The predominating orientation of filaments and other structural details in gaseous nebulae, 2154. New system of fine-fibrous nebulae in Auriga, 6435

ek, R. J. *See also* Cole, A., 7108

ek, R. J. and Bonner, T. W. Formation of hydrogen peroxide in water by 1 MeV protons, 8742

imova, K. V. and Belikova, T. P. Duration of excitation states of some phosphors, 5400

imova, K. V. and Mendakov, N. S. Photoluminescence of a sublimate phosphor of silver iodide, 1540

ionin, Yu. Ya. *See* Kozyrev, B. M., 3431

ne, C. D. *See* Neyman, J., 3825

nley, T. J. B. *See* Harris, G. G., 3562

nmugadhasan, S. The quantization of classical spin theory, 1386

piro, E. *See* Mandeville, C. E., 1082, 2657, 3549

Shapiro, I. S. Laws of transformation of spinors representing solutions of Dirac's equation, 615. On the question of the transformation properties of wave functions of spin $\frac{1}{2}$ particles, 5297

Shapiro, M. M. Cross sections for the formation of the compound nucleus by charged particles, 4344

Shaposhnikov, I. G. and Gol'dberg, Z. A. Absorption of sound in binary mixtures, 5342

Sharbaugh, A. H. *See also* Bragg, J. K., 828

Sharbaugh, A. H., Bragg, J. K. and Crowe, R. W. The use of the mercury cathode in the dielectric breakdown of liquids, 6825

Sharbaugh, A. H., Heath, G. A., Thomas, L. F. and Sheridan, J. Microwave spectrum and structure of iodosilane, 2347

Sharma, D. *See* Douglas, A. E., 3141

Sharma, H. D. Double beta decay of Te^{130} and Se^{82}, 5019

Sharma, J. *See* Bose, H. N., 3163, 6665

Sharman, L. J., Sones, R. H. and Cragg, L. H. Effects of rate of shear on inherent and intrinsic viscosities of polystyrene fractions, 5874

Sharonov, V. V. Determination of horizontal refraction in the atmosphere of Venus from the observation of the Lomonosov effect, 1339

Sharp, R. T. *See also* Horton, G. K., 2947

Sharp, R. T. and Horton, G. K. A variational approach to the unipotential many-electron problem, 4590

Sharpe, J. Energy per ion pair for argon with small admixture of other gases, 934. Measurement of moisture content by neutron counting, 7265

Sharpe, J. and Salmon, P. G. Characteristics of BF_3 counters and precautions to be adopted in their use, 4877

Sharpe, J. and Wade, F. A re-entrant thimble ionization chamber, 3377

Sharrah, P. C. and Smith, G. P. Neutron diffraction and atomic distribution in liquid lead and liquid bismuth at two temperatures, 2747

Sharvin, Yu. V. and Balashova, B. M. Structure of superconductors in the intermediate state, 5479

Shavtvalov, L. Ya. Investigation of γ-rays by means of photoelectrons, 6209

Shaw, D. and Weltmann, R. N. A logarithmic counting-rate recorder, 16

Shaw, E. A. G. The acoustic wave guide. I. An apparatus for the measurement of acoustic impedance using plane waves and higher order mode waves in tubes, 3049; II. Some specific normal acoustic impedance measurements of typical porous surfaces with respect to normally and obliquely incident waves, 3050

Shaw, H. L. *See* Udy, M. C., 8155

Shaw, J. H. *See also* Benedict, W. S., 2351; Howard, J. N., 4019

Shaw, J. H., Oxholm, M. L. and Claassen, H. H. The solar spectrum from $7\ \mu$ to $13\ \mu$, 3812

Shaw, P. F. D. *See* Baker, J. M., 4280; Eliot, E. A., 3582

Shaw, T. M. and Elsken, R. H. Investigation of proton magnetic resonance line width of sorbed water, 4912

Shchukin, E. D. *See* Melnikova, N. T., 2087

Sheffer, H. and Hyde, J. C. An important reflectance correction in light-scattering studies, 3186

Sheingold, L. S. The susceptance of a circular obstacle to an incident dominant circular-electric wave, 4228

Sheldon, J. and Thomas, L. H. The use of large scale computing in physics, 2897

Sheline, R. K. *See also* Becker, R. S., 7118

Sheline, R. K. and Johnson, N. R. New long-lived magnesium-28 isotope, 3554. Decay scheme of magnesium 28, 5676

Shelton, A. V. *See* Schecter, L., 5065

Shen, S. F. Note on the distribution of singular directions of a two-dimensional shock, 78. An estimate of viscosity effect on the hypersonic flow over an insulated wedge, 3025

Shenstone, A. G. Forbidden transitions in the palladium I spectrum, 8313. Wadsworth mounting for grating, 8345

Shepherd, A. A. Poisoning of oxide cathode emission by oxygen, 938. The effects of oxygen on the electrical properties of oxide cathodes, 4892

Shepherd, H. J. *See* Hannan, R. S., 2023

Sheppard, N. *See* Bethell, D. E., 7566; Hadži, D., 3123

Sheppard, P. A. Atmospheric turbulence, 1278. Meteorological processes controlling the refractive index of the atmosphere, 1289
Shepsenvol, M. A. *See* Shul'man, A. R., 5995
Shercliff, J. A. Steady motion of conducting fluids in pipes under transverse magnetic fields, 4220
Sheridan, J. *See* Sharbaugh, A. H., 2347
Sherman, D. F. Production of negative μ-mesons and their behavior in nuclear research emulsions, 5107
Sherman, N. Diurnal variations in the intensity of cosmic rays underground, 1728
Sherman, R. H. *See* Pontarelli, D. A., 1804
Sherr, R. and Gerhart, J. B. Experimental evidence for the Fermi interaction in the β decay of O^{14} and C^{10}, 7885
Sherry, N. P. R. *See* Bates, L. F., 8579
Sherwood, R. M. *See* Young, R. W., 93
Shestopalov, V. P. Theory of a waveguide with a spiral (conductor), partially filled with a dielectric, 5585
Shestukhina, V. V. *See* Eremeev, M. A., 6100–1
Shewell, J. R. *See* Besdin, D. J., 7787
Shibayama, K. *See* Nimura, T., 1459
Shibuya, Y. A theoretical study of the Young's moduli of binary solid solutions, 4418. *See also* Fukuroi, T., 4399
Shibuya, Y., Fukuda, Y. and Fukuroi, T. On the lattice vibrations of a binary superlattice alloy, 4244. On the vibrational spectrum and the vibrational specific heat of a binary superlattice alloy, 4245
Shido, N. *See* Mizushima, S.-I., 7258
Shillito, R. *See* Butement, C. A., 1868
Shimada, J. *See* Abe, H., 4914
Shimamoto, Y. *See* French, J. B., 7896
Shimanouchi, T. *See* Mizushima, S.-I., 3497, 7258; Nakagawa, I., 1016
Shimauchi, A. *See* Kojima, S., 1666, 8621
Shimazu, H. *See* Hara, O., 3866
Shimbo, S. *See* Wada, Y., 5343
Shimizu, M. On the magnetism of magnetic compounds: general treatment of superexchange interaction, 8515
Shimoda, K. *See* Nishikawa, T., 7572
Shimomura, Y. and Nishiyama, Z. On the crystal structure of nickel oxide, 1259
Shimooda, H. On the new description of quantum-mechanics, 2935
Shinohara, S. and Hoshino, R. The electrolytic aluminium-oxide rectifier, 3305
Shipley, D. W. A method for the measurement of spherical aberration of an electrostatic electron lens, 1680. Calculation of spherical aberration for the electrostatic electron lens, 2483
Shipley, F. M. *See* Finlayson, D. M., 227; Johnson, V. A., 4808
Shipman, J. D., Jr. *See* Perlow, G. J., 303
Shirane, G. and Pepinsky, R. Phase transitions in antiferroelectric $PbHfO_3$, 7656
Shirn, G. A. and Wajda, E. S. A simple automatic counter, 925
Shirokov, Yu. M. Relativistic theory of free three-dimensional particles, 605. On the spin of particles with zero rest mass, 2950
Shishakov, N. A. An electronographic investigation of hydroxide films on the metals Mg, Al, Fe and Cu, 6255
Shive, J. N. The properties of germanium phototransistors, 4096
Shklovskiĭ, I. S. Nature of the radiation from radio-stars, 7391
Shmushkevich, I. M. *See* Ioffe, B. L., 3612–13, 5100; Pomeranchuk, I. Ya., 8684
Shockley, W. Transistor electronics: imperfections, unipolar and analog transistors, 854. Interpretation of e/m values for electrons in crystals, 987. Cyclotron resonances, magnetoresistance, and Brillouin zones in semiconductors, 4805. *See also* Benedict, T. S., 4077
Shockley, W. and Prim, R. C. Space-charge limited emission in semiconductors, 6046
Shoemaker, D. P. *See* Marsh, R. E., 2823
Shoemaker, F. C. *See* Mozley, R. F., 478
Shoenberg, D. The de Haas–van Alphen effect at high fields, 974. Superconductivity, 6801
Shono, N. Non-local theory of nucleon meson field, 3872
Shôno, N. and Oda, N. Note on the non-local inte action, 2949
Shore, F. J. *See* Bendel, W. L., 6201
Shorey, W. R. J. *See* Bartholomew, R. M., 7062
Shortley, G. Use of Tschebyscheff-polynomial ope ators in the numerical solution of boundary-val problems, 3784
Shostakovich, N. *See* Alikhanyan, A., 5551
Shrader, E. F. *See* Rosenblum, E. S., 1091
Shrader, R. E. *See* Zworykin, V. K., 787
Shreffler, R. G. *See also* Koski, W. S., 643; Wals J. M., 2994
Shreffler, R. G. and Deal, W. E. Free surface prope ties of explosive-driven metal plates, 2749
Shrikantia, G. S. *See* Kannangara, M. L. T., 8499
Shubnikov, A. B. *See* Konstantinova, V. P., 1469
Shubnikov, A. V. The so-called homology of crystal 7272
Shugar [Sugár], I. A new method of making prepara tions for electron microscopic examination of t surface structure of metals, 2760
Shugurov, V. K. *See* Yutsis, A. P., 5661
Shuler, K. E. A free-electron model for π-molecul complexes, 1802. Adiabatic correlation rules f reactions involving polyatomic intermediate com plexes and their application to the formation $OH(^2\Sigma^+)$ in the H_2–O_2 flame, 4440. An approxima calculation of the benzene self-complex interactio energy at high pressure, 5617. *See also* Herma R. C., 4254
Shull, C. G. and Wilkinson, M. K. Neutron diffra tion studies of various transition elements, 8525
Shull, E. R. *See* Rank, D. H., 3984; Wiggins, T. A 7580
Shull, F. B. *See* McFarland, C. E., 2699
Shull, H. *See* Ellison, F. O., 8625
Shul'man, A. R., Fedorov, V. N. and Shepsenvo M. A. Heat conductivity of aluminium oxide high temperatures, 5995
Shul'man, M. S. *See* Novosil'tsev, N. S., 5454 5457
Shulman, R. G. and Van Winkle, D. M. Pressure welded *p-n* junctions in germanium, 4097
Shulz, A. G. *See* White, R. S., 1148
Shuppe, G. N. *See* Smirnov, B. G., 885
Shutt, R. P. *See* Fowler, E. C., 7175; Fowler, W. B 7171, 8688; Whittemore, W. L., 1736
Siday, R. E. High resolution and high precision beta spectrometry, 5026
Sidhu, S. S. and McGuire, J. C. An X-ray diffractio study of the hafnium-hydrogen system, 1262
Sidran, M. *See* Kallmann, H., 920
Sieden, J. On the effects of magnetic defects in a strong focusing cosmotron, 6856
Siedentopf, H. *See also* Behr, A., 5276, 5835
Siedentopf, H. and Behr, A. The ionospheric storm Feb. 23–28, 1952, 1283
Siedentopf, H., Behr, A. and Elsässer, H. Phot electric observations of the zodiacal light, 5836
Siedentopf, H. and Elwert, G. Radio frequenc emission by cosmic-ray electrons, 2908
Siegbahn, K. Energy calibration of instruments, 503 *See also* Lindström, G., 3564
Siegert, A. J. F. Remarks on the theory of fusion an condensation, 4055
Sieswerda, B. S. *See* Dijkstra, H., 4046
Siksna, R. Positive ions formed by an open electri heater, 2511. Mobility spectra of ions formed in room by negative corona discharge, 2513. *See als* Norinder, H., 1709, 2512, 3327, 4166
Sil, N. C. Pseudoscalar meson field and the scatterin of fast neutrons by protons, 3878
Silant'ev, A. *See* Dzhelepov, B., 7890
Silber, R. A comparator for determining levels pressures, 5314
Silberberg, A. and Kuhn, W. Miscibility of liqui influenced by rate of shear, 653
Silberg, P. A. *See* Bachman, C. H., 4171
Silberman, A. E. *See* Zilberman, A. E.
Silberstein, L. Elementary probability of efficie absorption of a quantum proportional to the volum of a grain, 4542
Silin, V. P. *See* Klimontovich, Yu. L., 5307, 5309
Sils, V. *See* Smakula, A., 8048

ee, F. B. Extension and dissemination of the electrical and magnetic units by the National Bureau of Standards, 1737
rman, A. *See also* Cocconi, G., 1917
rman, A. and Stearns, M. Production of π^0-mesons by γ-rays on hydrogen, 1916
rman, J. *See* Copeland, C. S., 1998
rman, S. *See* Bullock, B. W., 739, 5152
rnail, C. J. Note on fast spectrographic camera design, 5946
stri, M. *See* Cerrai, E., 1854–5
di, A. A. *See* Horowitz, M., 815
ně, Č. Elementary theory of accelerators, 4146
nov, Yu. P. *See* Novoselova, A. V., 6318
a, R. On the statistical theory of crystallite length, 371. *See also* Frisch, H. L., 3697
ons, A. T. F. *See* Lloyd, H., 2223
ons, B. E. *See* Lewis, H. W., 7920
ons, E. L. *See* Rollin, B. V., 3312–13
ons, L. M. *See* Gutmann, F., 7481
ons, W. M. *See* Guest, P. G., 3971, 5548
s, D. L. *See* Lawson, D. I., 3249
ad, M. T. Radioisotopes in the study of metal surface reactions in solutions, 4400
ad, M. T. and Derge, G. Note on the nature of conduction in liquid iron oxide and iron silicates, 5470
zaka, J. *See* Okamura, T., 4209
n, A. Higher spin polarizations in nuclear reactions, 5054. Theory of polarized particles in nuclear reactions [of the form $a + X \rightarrow Y + b$], 7122. *See also* Schrader, R., 8581
n, A. and Welton, T. A. Production of polarized particles in nuclear reactions, 3580, 5864
n, A. W. On a routine analytic method for the solution of problems in statics, 3888
n, D. M. and Wong, E. L. Burning velocity measurements, 6716
n, F. E. *See* Dugdale, J. S., 6725; Kurti, N., 7634
n, G. P. *See* Ginell, W. S., 5050
n, H. Experiments on the variations of photoconductivity of CdS crystals on irradiation with X-rays, and the manufacture of a vacuum CdS crystal cell used as a dosemeter employing a new echnique, 6792
n, I. Forces acting on superconductors in magnetic ields, 2466. *See also* Bridgman, P. W., 4435
n, I. and McMahon, H. O. Study of the structure of quartz, cristobalite, and vitreous silica by reflecion in infrared, 1519
n, J.-C. and Weill, G. On the longitudinal radiation rom dielectric aerials, 2568
n, R. F. *See* Clewell, D. H., 7341
nds, J. L. and Heller, R. The initial-throw method of operation of a Rayleigh disk, 2291
nnin, P. *See* Laurent, H., 7905
ns, J. *See* Russell, K. E., 5614
ns, J. H. and Dunlap, R. D. Properties of *n*-pent- orane and its mixtures with *n*-pentane, 70
ns, J. H. and Garbek, C. S. Elastic scattering and neutralization of low velocity hydrogen ions in methforane and ethforane, 4151
ns, J. H. and Mausteller, J. W. The properties of *n*-butforane and its mixtures with *n*-butane, 71
ns, J. H., Scheirer, C. L., Jr and Ritter, H. L. Magnetic weighing and gas-density balances, 2224
ns, L. The existence of positronium chloride, 4943. Decay of ^{198}Au, 4988
ns, L. J. G. *See* de Jong, D., 3583
son, J. A. *See also* Marton, L., 5515
son, J. A. and Fagot, W. C. Properties of the low energy nucleonic component at large atmospheric depths, 6923
son, J. A., Fonger, W. and Treiman, S. B. Cosmic radiation intensity-time variations and their origin. . Neutron intensity variation method and meteoro- ogical factors, 6126
son, J. A. and Uretz, R. B. Cosmic-ray neutron production in elements as a function of latitude and altitude, 4191
son, J. H. and Armstrong, H. L. Reverse charac- eristics of high inverse voltage point contact germanium rectifiers, 2455
son, O. C. *See* Thorn, R. J., 3441, 5370
son, W. T. *See* Albrecht, A. C., 6624
Sims, G. D. *See* Lindsay, P. A., 8476
Sims, R. B. and Place, J. A. The stresses in the reels of cold reduction mills, 7994
Singer, L. S. *See also* Hutchison, C. A., Jr, 1752
Singer, L. S. and Spencer, E. G. Temperature variation of the paramagnetic resonance absorption of two free radicals, 6946
Singer, S. F. Meteorites and cosmic rays, 1340, 6397. Meteorites as cosmic ray meters, 4182. Synoptic rocket observations of the upper atmosphere, 6328. Abundances in the primary cosmic rays, 6437
Singer, S. F. [Conf. rep.]. Physics of the high atmosphere, 2842
Singer, S. F., Maple, E. and Bowen, W. A., Jr. Dynamo currents and conductivities in the earth's upper atmosphere, 2100
Singh, H. *See* Parthasarathy, S., 3944, 8283
Singh, K. *See* Bowden, F. P., 8735
Singh, L. The effect of a strong electrostatic field on scattering, 4032. A note on the Raman spectrum of thianthrene in solution, 8335
Sinyakov, E. V., Stafiĭchuk, E. A. and Chern'yĭ, B. K. On account of remarks of M. S. Kosman on "Dynamics of barium titanate polarization process," 3290
Sirkar, S. C. and Roy, N. K. On the Raman spectrum of monomeric methyl methacrylate at -180°C, 5973
Sirvetz, M. H. *See* Kikuchi, C., 380; Weston, R. E., Jr, 1004
Sirvetz, M. H. and Weston, R. E., Jr. The structure of phosphine, 5645
Sitenko, A. G. *See* Akhiezer, A. I., 3329
Sitte, K. On the collison cross-sections in penetrating cosmic-ray showers, 2524
Sittel, K. *See* Rouse, P. E., Jr, 5872
Sittkus, A. The path of an atomic explosion aerosol. Remarks on the communication of W. Herbst and K. Philipp, 7363
Sittkus, A., Ganz, D. and Remy, E. Investigation of the radioactive background rays and their effect, 8647
Sivanov, V. S. *See* Dyakov, V. A., 2118
Sivaramakrishnan, M. V. Changes of atmospheric electric potential gradient at Poona during disturbed weather, 4514
Sivertsen, J. M. *See* Marx, J. W., 2765
Sjöberg, S. *See* Borelius, G., 3660
Sjöstrand, N. G. The influence of a cadmium sheet on the distribution of neutrons in graphite, 7183
Skaggs, L. S. *See* Lanzl, L. H., 6216
Skillman, W. *See* Oxley, C. L., 7730
Skinner, G. B. and Johnston, H. L. Thermal expansion of zirconium between 298°K and 1600°K, 7623
Skinner, S. M., Savage, R. L. and Rutzler, J. E., Jr. Electrical phenomena in adhesion. I. Electron atmospheres in dielectrics, 4433
Skolnik, M. *See* Jones, T. B., 5489
Skomal, E. N. *See* Yost, W. J., 3762
Skornyakov, G. V. Radiation of gamma rays upon disintegration of the μ-meson, 8695
Skraba, W. J., Burr, J. G., Jr and Hess, D. N. The decomposition of methanol-C^{14} under the influence of its own radiation, 8026
Skudrzyk, E. The internal friction and elastic properties of solid, liquid and gaseous bodies. II, 3672
Skugarevskaya, O. A. On the initial stages of the process of establishing an electric current in a layer lying on an ideally conducting foundation, 4794. On the final stages of the process of establishing an electric current in a layer lying on an ideally conducting foundation, 4795. *See also* Tihonov, A. N., 4796
Skyrme, D. M. The multiple scattering of protons in thin foils, 4149
Skyrme, T. H. R. *See* Mandl, F., 2678, 7934
Slack, M. R. *See* Price, P. H., 1572
Slansky, S. On the wave-mechanical potentials of the photon and the interactions between electrified particles, 5296. On the wave function of the annihilated photon, 6488
Slater, C. H. W. Improvements in fine wire thermocouples, 8379
Slater, J. C. Quantum theory of matter, 26. A generalized self-consistent field method, 7850. Ferromagnetism and the band theory, 8522

Slater, N. B. Gaseous unimolecular reactions: theory of the effects of pressure and of vibrational degeneracy, 5155

Slätis, H. A semicircular [focusing] permanent magnet beta-ray spectrograph [with uniform field] for photographic recording of conversion lines, 6844. A semicircular permanent magnet beta-spectrograph for photographic recording of conversion lines, 6845. *See also* Hjalmar, E., 4345

Slätis, H. and Lindström, G. The inherent half-width of *K*-conversion lines, 1670

Slätis, H. and Zappa, L. The disintegration of Zr^{95} and Nb^{95}, 3552

Slavatinskiĭ, S. A. *See* Azimov, S. A., 7757

Slavin, W. *See* Bergstralh, T. A., 6859

Slavyanskiĭ, V. T. On the conditions of the performance of an absolute mercury manometer, 5870

Slawsky, Z. I. *See* Schwartz, R. N., 348

Slichter, C. P. *See* Gutowsky, H. S., 2617

Slichter, L. B. *See* Price, A. T., 5228

Slichter, W. P. and Kolb, E. D. Solute distribution in germanium crystals, 7279

Slifkin, L., Lazarus, D. and Tomizuka, T. The diffusion of antimony in silver single crystals, 1959

Sliv, L. A. *See also* Peker, L. K., 7832

Sliv, L. A. and Listengarten, M. A. The internal conversion of magnetic dipole radiation in the L_1-shell with consideration of the finite dimensions of the nucleus, 3566

Sloan, L. L. and Altman, A. Aniseikonia and the Howard-Dolman test, 5823

Sloane, R. H. and Hobson, R. M. The liberation of positive ions by negative ion bombardment of surfaces, 8481

Slonczewski, J. C. and Heller, R. Determination of the coefficient of surface tension by the bubble-length method, 3915*

Slowinski, E. and Elliott, N. Lattice constants and magnetic susceptibilities of solid solutions of uranium and thorium dioxide, 6953

Sluis, K. L. Vander. *See* Vander Sluis, K. L.

Smakula, A., Kalnajs, J. and Sils, V. Inhomogeneity of thallium halide mixed crystals and its elimination, 8048

Smakula, A. and Klein, M. W. Investigation of crystal growth by thermal etching and oriented overgrowth, 2048

Smales, A. A. The scope of radioactivation analysis, 4459

Small, R. *See* Petrie, W., 4517

Smaller, B., Yasaitis, E. L., Avery, E. C. and Hutchison, D. A. Spin-spin interaction in HD nuclear resonance, 356

Smallman, R. E. *See* Williamson, G. K., 8794

Smart, J. *See* Howard, L. N., 6942

Smart, J. S. Magnetic structure transitions, 4202. The molecular field treatment of antiferromagnetism, 8517

Smedvik, L. *See* Andersen, F., 3137

Smekal, A. Bond differences between crystalline and amorphous states of aggregation, 1955

Smekal, A. G. The dynamics of brittle tensile fractures in cylindrical glass rods, 5144

Smirnov, B. G. and Shuppe, G. N. The work function of the electrons at some of the faces of a tungsten monocrystal, 885

Smirnov, L. V. Polarization absorption spectra of oriented dye molecule, 3117

Smirnov, S. P. *See* Butuzov, V. P., 8358

Smirnova, V. I. and Ormont, B. F. Determination of the surface tension of substances at their melting points, 5323

Smit, J. The influence of elastic shear strains on the conductivity and thermo-electric force of cubic metals, 2469. *See also* Polder, D., 8570; Rathenau, G. W., 961

Smit, J. A. *See* Milatz, J. M. W., 3976

Smith, A. *See* der Mateosian, E., 1069

Smith, A. B., Caird, R. S. and Mitchell, A. C. G. Some experiments on Ge^{75} and Ge^{75m}, 398

Smith, A. B. and Mitchell, A. C. G. The *K*/*L* ratio for the 90-keV line of Nd^{147}, 421

Smith, A. D. N. The effect of small amounts of cold-work on Young's modulus of copper, 7987

Smith, A. L. and Johnston, H. L. The molecula spectra of condensed oxygen and the O_4 molecul 1517. A cryostat for magnetic susceptibilit measurements at low temperatures, 6006

Smith, A. M. On the theory of beta-radioactivity, 108

Smith, A. W. and Turkevich, J. The effects of neutro bombardment on a zinc sulphide phosphor, 3156

Smith, B. and Boorse, H. A. Helium II film transpo rates over various surfaces, 5442

Smith, B. H. An investigation of the air chamber horn type loudspeakers, 3060

Smith, B. W. *See* Wiles, D. R., 3608

Smith, C. C. and Seliger, H. H. Improvement response of 4π gamma-ionization chambers, 6107

Smith, C. G. Current densities of free-moving cathod spots on mercury, 7705

Smith, C. L. *See* Braams, R., 6228; Livesey, D. 444, 7147

Smith, C. S. *See also* Fein, A. E., 691

Smith, C. S. and Burns, J. W. The elastic constants Cu – 4 per cent Si, 2764

Smith, C. S. and Wallace, W. E. Acoustic wa velocities, elastic constants and Debye chara teristic temperature for polycrystalline MgCd, 721

Smith, D. C. *See* Nielsen, J. R., 1532, 3142, 5961–2

Smith, D. F. The microwave spectrum and structure chlorine trifluoride, 4266

Smith, D. M. [Conf. rep.]. Summarized proceedings the third international spectroscopy colloquium Hoddesdon, September, 1952, 1488

Smith, D. R. Carbon-14 sample preparation a counting techniques; solid and liquid countin methods, 3538

Smith, E. E. [Conf. rep.]. Summarized proceedings of meeting on radiation protection—London, Januar 1953, 8152

Smith, E. E. and Whiffin, A. C. Density measureme of concrete slabs using gamma radiation, 1099

Smith, E. K., Jr and Weintraub, S. The constants the equation for atmospheric refractive index radio frequencies, 8593

Smith, F. G. Apparent angular sizes of discrete rad sources. Observations at Cambridge, 1337. T measurement of the angular diameter of radio sta 2147

Smith, F. M., Birnbaum, W. and Barkas, W. Measurements of meson masses and related quant ties, 8700

Smith, G. P. *See* Sharrah, P. C., 2747

Smith, H. G. The crystal structure of strontium hydro ide octahydrate, $Sr(OH)_2.8H_2O$, 8110

Smith, H. M. The estimation of absolute frequency 1950–51, 14

Smith, H. M. and Hansen, S. Shadow of an electr beam, 266

Smith, J. E. *See* Blau, M., 7910

Smith, J. G. and Hooley, J. G. The mechanism of gla polishing, 7194

Smith, J. J. The derivation of vector potential fro tables for scalar potential, 4921

Smith, J. M., Jr. Radiation safety for a reactor, 7946

Smith, J. P. *See* Benson, F. A., 7703

Smith, J. R. *See* Conner, J. P., 1116; Cook, C. F., 27

Smith, J. W. *See* Few, A. V., 4790

Smith, K. F. *See* Bellamy, E. H., 4279

Smith, L. A. *See* Babelay, E. F., 6865

Smith, L. G. and Damm, C. C. Mass synchromet doublet measurements at masses 28 and 30, 5666

Smith, P. L. *See* Hill, R. W., 3270, 7633

Smith, P. W., Jr. Systematic errors in indirect measu ments of the velocity of sound, 703. Precisi measurement of the velocity of sound in air, 2293

Smith, R. A. The physical principles of thermodynami 4777. Infra-red photo-conductors, 8424

Smith, R. C. T. Conduction of heat in the semi-infin solid, with a short table of an important integr 5993

Smith, R. D. *See* Rutherglen, J. G., 8678

Smith, R. M. *See* Nielsen, J. R., 3142

Smith, R. N. Phase transitions in surface films on soli 3694

Smith, S. W. and Dimmick, F. L. The facilitative eff of red light on dark adaptation, 6339

Smith, T. Supplementary note on ray tracing, 1481

Smith, T. S. *See also* Daunt, J. G., 240; Nicol, J., 24

h, T. S. and Daunt, J. G. Some properties of superconductors below 1°K. III. Zr, Hf, Cd, and Ti, 864
h, T. S., Gager, W. B. and Daunt, J. G. Some properties of superconductors below 1°K, 3315
h, T. T. The constant battery Wheatstone bridge, 4111
h, W. I. B. *See* Walker, D., 1104
h, W. L. *See* Scherrer, V. E., 8687
h, W. MacF. The sodium photosensitized isomerization of cis-butene-2, 1230
h, W. S. and Kirchgessner, W. G. A method of preparing replicas for electron microscopic examinations, 6257
h-White, W. B. An elementary non-conservative electrical system, 2430. The Poisson–Kelvin hypothesis and the theory of dielectrics, 2434
s, D. W. and Wiebenga, E. H. Measurement of X-ray intensities on integrated Weissenberg-photographs, 7306
s, F. *See* Gentner, W., 6327
luchowski, R. Magnetic susceptibility of bromine-graphite, 8513
ut, D. W. S. Variation of the Klein–Nishina differential cross section with gamma energy, 2667
th, C. P. *See* Powles, J. G., 1612
th, M. J. The corona and geomagnetism, 4494
the, W. R. The [electrical] resistance of a truncated hemisphere, 859. Current flow in cylinders, 2441. Charged disk in cylindrical box, 6746
grove, J. A., Greenspan, H. and McIntosh, R. The dielectric behavior of vapors adsorbed on silica gel, 5180
grove, J. A. and McIntosh, R. The orientational polarization of absorbed polar molecules, 5179
l, A. H. The nuclear reactor as a research implement, 1138
l, W. A. *See* Kulp, J. L., 1046
zer, E. Charge states of a helium beam in hydrogen, helium, air and argon, 4390
w, A. I. Magnetic moment orientation and thermal expansion of antiferromagnetic CrSb, 8357
w, G. *See* Hafner, E. M., 1923
wden, M. and Bevan, A. R. A continuously sensitive diffusion cloud chamber for operation at four atmospheres, 3384
wdon, S. C. and Whitehead, W. D. The total neutron cross sections of gold, chlorine, and phosphorus, 5084
der, H. S. *See* Courant, E. D., 907, 7729
der, T. M. *See* Stewart, H. B., 7158
olev, N. N. *See* Ryabinin, Yu. N., 5406
el'man, I. I. The line width of Rayleigh scattering in a gas, 7611
erman, R. A. *See* Field, R. F., 828
ha, M. S. Effect of absorption by the material of the prism on its resolving power, 3966. Resolution of two spectral lines of unequal intensity, 3974. Intensity considerations in Lummer–Gehrcke plate, 4041. On the resolving power of transmission echelon, 6673. Resolving power of the Fabry–Perot etalon, 7608. *See also* Majumdar, K., 5376
ha, M. S. and Varshni, Y. P. Improvement of Cornu's method for determining elastic constants, 4417
ing, H. On the rigorous proof of a method of measuring non-linear distortion on an intermodulation basis, 6552
hngen, E. *See* Eckert, E. R. G., 177
ya, T. On the ultrasonic velocity in suspension, 2264
n, L. T. *See* Barclay, C., 8781
olov, A. A., Klepikov, N. P. and Ternov, I. M. On the question of radiation by fast electrons in a magnetic field, 8224
olov, N. D. Quantum mechanical treatment of the interaction of a polar molecule with an atom, 5609. On the quantum theory of spectroscopic phenomena of the hydrogen bond, 5619. On the theory of spectroscopic phenomena of the hydrogen bond, 5620. Quantum mechanical determination of the vibration frequencies of a compound with a hydrogen bond, 5628
olov, S. Y. Ultrasonic microscope, 8298
olov, V. S. Ultrasonic detection of stratifications in materials without machining of surface, 7532
Sokol'skaya, I. L. Investigation of the autoelectric emission from a monocrystalline point by means of a spherical electron projector, 6077
Soled, J. *See* Lehovec, K., 8768
Solis, M. *See* Otero, J.-M., 1310
Solmitz, F. T. Proton-proton scattering for a nucleon isobar model, 4871
Soma, J. and Ogi, M. On a non-linear approximation of the interatomic force in solid, 1800. Corrections to our paper "On a non-linear approximation of the interatomic force in solid," 8610
Somayajulu, Y. V. Determination of the coefficient of recombination in the ionosphere, 6903
Somers, E. V. Propagation of acoustic waves in a liquid-filled cylindrical hole, surrounded by an elastic solid, 5338
Somers, L. M. *See* Markstein, G. H., 6720
Somerville, J. M., Blevin, W. R. and Fletcher, N. H. Electrode phenomena in transient arcs, 2472
Sommacal, B. *See* Beretta, E., 1712
Sommerfeld, A. Electrodynamics, 2553
Sommeria, J. A new extraction principle for ion sources: applications to different types of sources, 1694. A new general method of extraction in ion sources: applications to different types of source. I. Discussion of the principles of the method, 5532; II. Experimental results, 5533
Sommerkorn, G. Bitter figures on 3 % Fe–Si alloys, 6146
Sommermeyer, K. The dosimetry of β-rays from radioactive isotopes in homogeneous substances, 1886. Dosimetry of radioactive substances. A simple method of measuring the specific activity of radioactive solutions, 5669. The absorption coefficients of β-energy of radioactive isotopes in air equivalent substances, 6204. Contribution to the dosage determination of β radiation from radioactive substances, 6348
Sommers, H. S., Jr. Vapor pressures of He^3-He^4 mixtures below the lambda point, 188. *See also* Dash, J. G., 3623
Sommers, S. C. *See* Christensen, W. R., 2860
Sondheimer, E. H. A note on the diamagnetism of free electrons, 3422. *See also* Howarth, D. J., 6781
Sones, R. H. *See* Sharman, L. J., 5874
Sonnenschein, R. R., Walker, R. M. and Stein, S. N. A micro glass electrode for continuous recording of brain pH, *in situ*, 8823
Sorbo, W. De. *See* De Sorbo, W.
Sorem, A. L. and Nelson, C. N. Spectral and luminance requirements for color-transparency illuminators, 8174
Sörensen, S. O. *See* Holtebekk, T., 7907; Isachsen, N., 5715
Sorenson, B. M. *See* Ames, D. P., 7077
Sorger, G. *See* Feldtkeller, R., 4916
Sosedova, A. L. *See* Ageeva, N. S., 1187
Souchay, F. *See* Barchewitz, P., 6999
Soulé, J.-L. Quantitative interpretation of differential thermal analysis, 2039. *See also* Le Bouffant, L., 1403
Soulmagnon, R. The anomalies of polarization and the variations of frequency of Raman lines, 5409
Sourdillon, M. Boys camera investigation of air discharges and of lightning strokes associated with essentially horizontal cloud discharges, 5254
Southworth, R. W. *See* Merriam, C. N., Jr, 2000
Sowerby, L. The couple on a rotating spheroid in a slow stream, 4640
Sowerby, M. G. *See* Armenteros, R., 7956; Barker, K. H., 4196, 1930
Spalding, C. K. *See* Christensen, W. R., 2860
Spalding, F. F. *See* Berstein, I. A., 8027
Spark, L. C. A simple X-ray micro-beam technique, 5510
Sparks, I. L. and Philipp, H. R. A retarding potential method for measuring electrical conductivity of oxide-coated cathodes, 4180
Sparks, M. *See* Teal, G. K., 858
Sparnaay, M. J. *See* Overbeek, J. T. G., 3481
Sparrow, C. *See* Freund, T., 3433
Spear, F. G. Radiations and living cells, 8139
Spear, P., Robinson, I. R. and Wolfe, K. J. B. The influence of machining and grinding methods on the mechanical and physical condition of metal surfaces, 4400

Specht, H. *See* Richter, H., 1179

Specht, R. D. and Greenfield, M. A. Spectral energy distribution in X-ray beam as a function of wavelength, 2474

Spedding, F. H. *See* Elliott, J. F., 6959; James, N. R., 840; Kip, A. F., 2537*; Legvold, S., 8554

Speer, D. A. *See* Gomer, R., 1707

Speer, F. *See* Gobrecht, H., 7726

Speight, K. *See* Bradshaw, F. J., 4404

Spektor, E. Z. *See* Danilova, A. I., 2757

Spells, K. E. Sensitive bubble jets, 3908

Spence, R. D. *See also* Hiedemann, E., 1985

Spence, R. D., Moses, H. A. and Jain, P. L. The proton magnetic resonance line in liquid crystals, 3435

Spencer, D. E. *See* Moon, P., 3082, 7419

Spencer, E. G. *See* Singer, L. S., 6946

Spencer, L. V. Penetration and diffusion of X-rays: calculation of spatial distributions by semi-asymptotic methods, 878. Calculation of peaked angular distributions from Legendre polynomial expansions and an application to the multiple scattering of charged particles, 3783. *See also* Goldstein, H., 4321

Spencer, L. V. and Wolff, C. Penetration and diffusion of hard X-rays: polarization effects, 4829

Sperduto, A. *See also* Enge, H. A., 1123

Sperduto, A. and Buechner, W. W. Magnetic analysis of the proton groups from the $\mathrm{Na}^{23}(d, p)\mathrm{Na}^{24}$ reaction, 1120

Sperry, A. B. A scintillation-counter power supply offering long-time stability, 4167

Spicer, B. M. The absolute measurement of high-energy radiation, 1858

Spiers, J. A. *See also* Satchelor, G. R., 2695

Spiers, J. A. and Blin-Stoyle, R. J. A formulation of beta-decay theory for forbidden transitions of arbitrary order. I. Selection rules and energy spectra, 408; II. Angular distributions, 409

Spindler, R. J. *See also* Stephens, R. E., 2317

Spindler, R. J. and Rodney, W. S. Refractivity of potassium bromide for visible wavelengths, 3091

Spinks, J. W. T. *See* Hummel, R. W., 5174

Spitzer, L., Jr. Equations of motion for an ideal plasma, 4222. *See also* Schwarzschild, M., 6385

Spitzer, L., Jr and Härm, R. Transport phenomena in a completely ionized gas, 3231

Spivak, G. V. and Dubinina, E. M. On the resolving power of an immersion electron objective, 7718

Splettstosser, H. R. and Seemann, H. E. Application of fluorescence X-rays to metallurgical microradiography, 2126

Spohr, D. A. *See* Webber, R. T., 8426

Sponer, H. *See also* Knipe, R. H., 4012; Rush, J. H., 1533; Sastri, M. L. N., 149

Sponer, H. and Herzfeld, K. F. The influence of vibration on forbidden electronic transitions, 1813

Spooner, H. and McConnell, L. D. An ethoxylene resin for photoelastic work, 6677

Spoor, A. *See* De Vries, H., 8141

Sproull, R. L. *See* Pell, E. M., 340

Spurlin, H. M. *See* Markwood, W. H., Jr, 3650

Squire, C. *See* Jacquinot, P., 5811

Squire, C. F. Note on reflection and diffraction from ice crystals in the sky, 568. Low temperature physics, 8366

Squire, H. B. Some viscous fluid flow problems. I. Jet emerging from a hole in a plane wall, 642. Investigation of the instability of a moving liquid film, 6523

Squires, G. L. *See* Stewart, A. T., 7184

Squires, P. The growth of cloud drops by condensation. I. General characteristics, 566; II. The formation of large cloud drops, 567

Squires, P. and Gillespie, C. A. A cloud-droplet sampler for use on aircraft, 4496

Srinivasan, D. *See* Parthasarathy, S., 1454, 2269, 3045, 3948, 5920–1, 7529, 8284, 8291–2

Srivastava, B. N. and Madan, M. P. Intermolecular force and coefficient of self-diffusion, 658. Thermal diffusion of gas mixtures and forces between unlike molecules, 3015. Intermolecular force and transport coefficients, 3483. Intermolecular force constants from thermal diffusion and other properties of gases, 5618. Thermal diffusion and force between unlike molecules, 6986

Srivastava, C. M. *See* Khastgir, S. R., 4124, 6817

Staab, K. *See* Schäfer, K., 727

Stabe, H. Contribution to the development of a ne
photographic recording process with immediate
visible and lasting traces, 6356

Stableford, W. H. *See* Jessop, H. T., 8347

Stacey, D. S. *See* Pietenpol, W. B., 4567

Stacey, F. D. *See* Jones, G. O., 4237

Stafford, E. *See* Donovan, G. E., 2488

Stafiĭchuk, E. A. *See* Sinyakov, E. V., 3290

Stafne, M. J. *See* Hughes, D. J., 5724

Stähelin, P. *See* Preiswerk, P., 5650

Stahl, P. and Forestier, H. Effect of the adsorbed gase
on the temperature of the surface devitrification i
vitreous state, 7966

Stair, R. Ultraviolet radiant energy from the su
observed at 11 190 feet, 3773

Stambaugh, R. B. *See* Morris, W. E., 1453

Stamm, R. F. and Button, P. A. Rayleigh's rati
(absolute turbidity levels) for benzene, carbo
tetrachloride, and toluene, 7614

Stamm, R. F. and Salzman, C. F. Relative speeds o
Raman spectrometers, 7554

Stamm, R. F. and Salzman, C. F., Jr. Photoelectri
Raman spectrometer with automatic range changing
II. Conversion of Perkin–Elmer infrared instrume
to grating type, 2327

Stamm, R. F., Salzman, C. F., Jr and Mariner, T
Photoelectric Raman spectrometer with automati
range changing. I. Conversion of photographi
instrument, 2326

Stammreich, H. and Forneris, R. The Raman spectru
of *p*-benzoquinone, 3164. The Raman frequency o
bromine monochloride, 5975

Standing, K. G. and Peelle, R. W. A method o
increasing the effective resolution of scintillatio
counters, 4162

Standley, K. J. *See* Adam, G. D., 8551

Stanley, E. The crystal structures of two potassiu
sodium chloride dithionates, 2833. Crystal structu
of a mixed salt of potassium chromate and potassiu
permanganate, 4486. The use of X-ray diffractio
cameras as recording optical goniometers, 5191

Stanworth, J. E. Physical properties of glass, 1321

Staras, H. Scattering of electromagnetic energy in
randomly inhomogeneous atmosphere, 335

Stark, J. Further experiments on the nature of ligh
4676

Starner, J. W. *See* Bunker, M. E., 8653; Knigh
J. D., 7874

Starodubtsev, S. V. *See* Angelov, B. P., 7676

Stasiw, O. Effect of the intensity of irradiation on th
mechanism of the photochemical reaction in silve
halides with an admixture, 5166

Statz, H. The theory of the saturation magnetization o
binary ferromagnetic alloys, 954

Staub, H. H. *See* Nicodemus, D. B., 4371

Stauss, H. E. *See* Klee, C. W., 5486

Staveley, L. A. K. *See* Thomas, D. G., 3013

Staverman, A. J. *See* Schwarzl, F., 3644

Stavitskaya, T. S. *See* Devyatkova, E. D., 5467

Steacie, E. W. R. *See* Jones, M. H., 6297; Whittle, E
6280

Stearns, C. *See* Lehovec, K., 8768

Stearns, E. I. *See* Pritchard, B. S., 169, 3196

Stearns, M. *See* Silverman, A., 1916

Stebbins, A. K. *See* Bleuler, E., 5056

Steckelmacher, W. *See* Ochert, N., 6540

Steel, W. H. A study of the combined effects o
aberrations and a central obstruction of the pupi
on the contrast of an optical image. Application t
microscope objectives using mirrors. I–II, 5379

Steele, M. C. Superconductivity below 1°K, 23
Application of the theory of numbers to the magneti
properties of a free electron gas, 950

Steele, M. C. and Hein, R. A. Size effects in the super
conductivity of cadmium, 237

Steenberg, K. Measurements of the distribution o
thermal neutrons and Rh-resonance neutrons i
isotope channel 5–11 by means of foil activation
7181. Measurements of neutron densities in th
JEEP by activation of Na_2CO_3 and absolute countin
of the activity, 7190. *See also* Holt, N., 7163

Steenberg, N. R. The angular distribution of γ-radia
tion from aligned nuclei, 415. The detection o
polarized γ radiation by the Compton process, 267

The polarization of γ-radiation from aligned nuclei, 5033. Population distribution of nuclei aligned at low temperatures, 5034
nland, M. J. *See* Poppema, O. J., 4289
r, G. Investigations on the electrode spot movement at the cathode of a low pressure mercury vapour arc, with variations in observation time, 6819
fen, R. M. The angular momenta of the excited states of Pt^{196}, 3523. Evidence of a mixed $E1+M2$ transition and the angular momenta of the Sr^{88} levels, 5695. Indications of the interaction of electric field gradients and nuclear electric quadrupole moments in angular correlation [of γ-rays], 7111
l, O. *See* Becker, E. W., 4633, 6511
le, P. *See* Page, L. A., 4070
ney, A. F. and Sugarman, N. Characteristics of Br^{87}, a delayed neutron activity, 1873
ger, N. H. *See* Aniansson, G., 8034
n, G. *See* Milling, B., 1221
n, G. M. Conformal maps of electric and magnetic fields in transformers and similar apparatus, 2891
n, M. v. *See* v. Stein, M.
n, R. P. Electrical fields in the Crookes dark space of a low pressure glow discharge in air and N$_2$, 1664
n, R. S. The polarizability and configuration of *n*-paraffins, 7023. *See also* Kestigian, M., 5984; Scott, K. W., 6984
n, R. S. and Sutherland, G. B. B. M. Interaction of methylene deformation frequencies in paraffin crystals, 3128
n, S. N. *See* Sonnenschein, R. R., 8823
nbacher, E. *See* Braune, H., 1206
nberg, J.-L. *See* Alon, I., 8190; Blum, E. J., 8188
nberg, M. A. Growth spirals originating from screw dislocations on electrolytically produced titanium [single] crystals, 2807
nberger, J. *See* Bodansky, D., 7167–8; Lindenfeld, P., 2740
nemann, S. Polar crystal form and piezoelectricity of ice, 5465
ner, J. Effect of an a.c. component on the distribution of the current in galvanic electrolytes, 6294
nhaus, D. W., Crosswhite, H. M. and Dieke, G. H. Short period investigations in spark discharges, 3975
pe, L. Researches on magnetophotophoresis, 1796
la, A. *See* Tamburino, S. M., 2641, 7855
son, P. H. and Preston, W. M. Total neutron cross section of sodium, 1921
oien, J. O. *See* Kelly, J. M., 3291, 7803
anov, A. V. *See* Krasnov, V. M., 5739
anov, B. I. *See* Vidro, L. I., 5627
hanou, S. E., Nigon, J. P. and Penneman, R. A. The solution absorption spectra of americium (III), (V), and (VI), 1522
hens, D. V. *See* Nevin, T. E., 6613
hens, E. R. *See* Lindner, L., 2319
hens, R. E. The effect on illuminance of a lens interposed between the source and the illuminated surface, 7538
hens, R. E. and Malitson, I. H. Index of refraction of magnesium oxide, 3090
hens, R. E., Plyler, E. K., Rodney, W. S. and Spindler, R. J. Refractive index of potassium bromide for infrared radiant energy, 2317
hens, W. E. *See* Wolff, M. M., 8457
henson, C. C. and Adams, H. E. Transition temperatures in solid solutions of ammonium chloride and ammonium bromide. A new transition in pure ammonium bromide, 181
henson, C. C., Corbella, J. M. and Russell, L. A. Transition temperatures in some dihydrogen and dideutero phosphates and arsenates and their solid solutions, 6003
henson, C. V. and Jones, E. A. The Raman spectrum, structure, force constants and thermodynamic properties of bromine pentafluoride, 1551
henson, G. and Kilmister, C. W. A unified field theory of gravitation and electromagnetism, 8209
henson, L. *See* Bartlett, J. H., 7251
k, M. *See* Wapstra, A. H., 3551
k, M. J., Wapstra, A. H. and Kropveld, R. E. W. The nuclear levels of ^{48}Ti, 7866
n, A. W. Space, field, and ether in contemporary physics, 1358
Stern, E. A. *See* Neher, H. V., 4899
Stern, F. *See* Beevers, C. A., 553
Stern, M. D. *See* Witnauer, L. P., 2033
Sternheimer, R. M. Double focusing of charged particles with a wedge-shaped, non-uniform magnetic field, 894. The density effect for the ionization loss in various materials, 932. The energy loss of a fast charged particle by Cerenkov radiation, 4143, 6850. Double focusing of charged particles by a system of two magnets with nonuniform fields, 8443
Sterns, E. I. Use of interference wedge for projection of a spectrum, 108
Steudel, A. The hyperfine structure of the Pb I line λ 4058 Å, 1501
Stevens, C. M. A vacuum lock for routine solid analyses with a mass spectrometer, 3019
Stevens, K. N., Kasowski, S. and Fant, C. G. M. An electrical analog of the vocal tract, 5934
Stevens, K. W. H. A note on exchange interactions [in paramagnetic salts], 8512. *See also* Bleaney, B., 8566; Elliott, R. J., 2545, 6950, 7797; Owen, J., 6952; Scovil, H. E. D., 2337
Stevenson, R. W. H. *See* Jones, D. A., 3148
Steward, E. G. *See* Runciman, W. A., 6656
Stewart, A. L. *See* Bates, D. R., 4177
Stewart, A. T. and Squires, G. L. The scattering of slow neutrons by *ortho-* and *para*-hydrogen, 7184
Stewart, H. B., LaViolette, F. G., McClelland, C. L., Gavin, G. B. and Snyder, T. M. Low-power thermal test reactor for nuclear physics research, 7158
Stewart, H. S. *See also* Curcio, J. A., 2851
Stewart, H. S. and Curcio, J. A. The influence of field of view on measurements at atmospheric transmission, 1291
Stewartson, K. On the flow between two rotating coaxial disks, 4638
Stiefel, E. Two applications of group characters to the solution of boundary-value problems, 2144
Stier, P. M. *See* Barnett, C. F., 6104; Evans, G. E., 6099
Stilbans, L. S. *See* Devyatkova, E. D., 796, 5467
Stille, U. Sharpness of the ozone layer optical upper limit, 2095. *See also* Cario, G., 1508
Stilwell, G. R. *See* Reynolds, F. W., 214
Stimson, H. F. The present status of temperature scales, 1588
Stirling, A. *See* Hinschberger, G., 7084
Stivers, E. C. *See* Yankwich, P. E., 2002
Stöber, W. *See* Franck, E. U., 3017
Stock, D. I. Micro-spherical aggregation of barium sulphate, 517
Stockmayer, W. H. and Casassa, E. F. The third virial coefficient in polymer solutions, 68
Stoicheff, B. The rotational Raman spectrum of benzene vapour, 7600
Stoicheff, B. P. On the vibrational Raman spectrum of gaseous ethylene, 5410
Stoker, P. H., Heerschap, M. and Ong Ping Hok. Measurements on the continuous beta-spectra, the conversion lines and the Auger-lines of $U(X_1 + X_2)$, 7088
Stoker, P. H. and Ong Ping Hok. Auger lines in the beta-spectra of UX and As, 5044. The beta-ray spectrum of ^{71}arsenic, 7087
Stoll, P. *See* Erdös, P., 7136; Glättli, H., 5069; Locher, K., 5072; Nabholz, H., 5704
Stoner, E. C. The analysis of magnetization curves, 8520
Stoppini, G. *See* Alberigi, A., 1704; Amaldi, E., 8495
Stora, C. The anomalous structure of triphenyl methyl bromide, 7017
Storchi, E. Small oscillations of water contained by plane walls, 5888. Determination of the potentials in generalized electromagnetic fields, 6457
Storer, J. E. *See* Keilson, J., 2963
Storey, L. R. O. Ultrasonic absorption in mixtures of ethyl alcohol and water, 2268. An investigation of whistling atmospherics, 8135
Størmer, C. Results of numerical calculations of the trajectories of electric corpuscles in the field of an elementary magnet. VIII. Periodic trajectories and trajectories in their vicinity, 890
Storruste, A. *See* Moon, P. B., 7113
Stott, F. D. A portable oximeter with provision for continuous recording, 5263

Stout, G. E. and Neill, J. C. Utility of radar in measuring areal rainfall, 5806
Stout, H. P. Ignition of wood by radiation, 3249
Stout, J. W. and Guttman, L. The electrical resistivity of indium-thallium solid solutions, 839. Superconductivity of indium-thallium solid solutions, 863
Stout, J. W. and Matarrese, L. M. Magnetic anisotropy of the iron-group fluorides, 8546
Stout, V. L. Luminescence and thermionic emission of barium oxide, 1548. A study of the luminescence of and optical absorption in barium oxide as a function of temperature and thermionic activity, 4031
Stovall, E. J., Jr. *See* Allred, J. C., 1114
Stover, B. J. and Conway, J. G. The absorption spectrum of hydrated americium chloride, 123
Straat, H. W. Compensation of astigmatic errors in a grating spectrograph, 6602
Strackee, J. *See* Clay, J., 4184, 4189
Straiton, A. W. Reflection of centimeter radio waves from ground and water surfaces, 5591. *See also* Hertel, P., Jr, 7660
Strandberg, M. W. P. *See* Burke, B. F., 3998; Eshbach, J. R., 729
Strasberg, M. The pulsation frequency of nonspherical gas bubbles in liquids, 5325
Strashkevich, A. M. Electron optical properties of electrostatic fields having diad symmetry, 6082. Basic relations of relativistic electron optics of non-axially symmetric electrostatic fields, 6083
Stratton, R. A surface contribution to the Debye specific heat, 7640
Stratton, T. F. *See also* Stratton, W. R., 438
Stratton, T. F. and Freier, G. D. The angular distribution of alpha-particles from the reaction of deuterons with tritons, 440
Stratton, W. R. *See also* Brown, R. J. S., 272; Yarnell, J. L., 4355
Stratton, W. R., Freier, G. D., Keepin, G. R., Rankin, D. and Stratton, T. F. The elastic scattering of deuterons by tritons, 438
Straubel, H. Electrostatic atomization of liquids, 8262
Strauch, K. On the detection of high energy particles with a fast coincidence system, 4164. *See also* Hoffmann, J. A., 5059
Stravseth, R. M. *See* Parker, J. G., 3046
Streed, E. R. *See* Kolb, A. C., 1489
Street, R. *See* Bacon, G. E., 4907
Strehlow, H. *See* Oel, H., 2014
Strelkov, P. G. *See* Kostryukova, M. O., 8384
Strickler, T. D. and Wadey, W. G. An automatic recording gamma-ray spectrometer, 2673
Strijland, J. *See* Michels, A., 2426
Stringer, J. B. *See* Wilkes, M. V., 7376
Stripp, K. F. *See* Zwanzig, R. W., 6741
Stroffolini, R. On the contribution to the electron component of cosmic radiation in the atmosphere deriving from the decay of the μ-particle, 8507
Stroh, A. N. The mean shear stress in an array of dislocations and latent hardening, 3663. A theoretical calculation of the stored energy in a work-hardened material, 7214. *See also* Frank, F. C., 533
Strohfeldt, M., McNicol, R. W. E. and Gipps, G. de V. Ionospheric measurements at oblique incidence over eastern Australia, 562
Strohmaier, K. Observations on the optical measurement of thickness with three-beam interference, 6670
Stroke, G. *See* Peters, J., 7606
Strömgren, B. Convection zones and compositions in stellar interiors, 6437. Theoretical methods for the analysis of stellar atmospheres, 6437. Evolution of stars, 7385
Strong, J. *See* Elder, T., 7354; Taylor, J. H., 1531
Struchkov, Yu. T. *See* Khotsyanova, T. L., 6321–3, 8096
Struve, O. *See* Huang, S.-S., 3834
Stuart, A. V. A simple variable thickness cell for liquids, 3977. Specific influence of solvents on the infrared spectra of alcohols, 6629
Stuart, A. V. and Sutherland, G. B. B. M. The effect of hydrogen bonding on the hindered rotation of the hydroxyl group in alcohols, 1826
Stuart, W. S. Measurement of ultrasonic intensities in water, 2290
Stübenrath, K. *See* Leo, W., 6587
Stuckes, A. D. Electro-thermal behaviour of poin contacts to semiconductors, 6779
Studer, F. J. and Cusano, D. A. Titanium dioxid films as selective reflectors of the near-infrared, 5977 *See also* Fehr, E. B., 1553
Stueckelberg, E. C. G. The *H* theorem and unitarit of *S*, 4776
Stueckelberg, E. C. G. and Wanders, G. Thermodynamics in general relativity, 8208
Stuke, J. On the optical absorption and reflection o amorphous and hexagonal selenium, 5966
Stukenbroeker, G. L. and McNally, J. R., Jr. Isotop shifts in thorium—Th 230 and Th 232, 1502
Stump, R. *See* Brown, H. B., 6217; Reardon, W. A 7106
Stumpf, F. B. *See* Cork, J. M., 1054
Sturgess, J. W. *See* George, E. P., 5557
Stuyts, A. L. *See also* Rathenau, G. W., 961
Stuyts, A. L., Rathenau, G. W. and Gorter, E. W Preferred crystal orientation in ferromagneti ceramics, 962
Styles, R. S. and Campbell, F. W. Radar observation of rain from non-freezing clouds, 4505
Subrahmanyam, N. *See also* Ramaiah, N. A., 6821
Subrahmanyam, N. and Ramaiah, N. A. The effect o "ageing" on the positive and negative Joshi effect in the region of self-sustained and non-self-sustaine a.c. discharges, 8433
Succi, C. and Tagliaferri, G. On the operation of th diffusion cloud chamber, 7745
Suchy, K. Stepwise transition from wave optics to ra optics in inhomogeneous anisotropic absorbin media. I. Equations for the wave-normals, refractive index and polarization, 2310*. *See als* Argence, E., 3461
Sucksmith, W. Magnets and magnetism—recent developments, 8552. *See also* Oliver, D. J., 6960
Sucksmith, W., Clark, C. A., Oliver, D. J. and Thompson, J. E. Spontaneous magnetization—technique and measurements, 8578
Suddeth, J. A. *See* Marton, L., 5515
Sue, P. *See* Chemla, M., 7853
Suematsu, S. *See* Nonaka, I., 256
Suemoto, Z. Electron temperature of the chromospheri eruption, 7402
Suffolk, S. F. *See* Burton, H., 194
Suga, K. *See* Kusumoto, O., 6124
Suganuma, R. *See* Fujiki, Y., 8717
Sugár, I. *See* Shugar, I.
Sugarman, N. Genetics of the Ge^{78}-As^{78} fission chain 2658. *See also* Kruger, P., 4993; Schmitt, R. A 4357; Stehney, A. F., 1873
Sugawa, C. The lengthening of the period of the fre nutation due to the inequality of three principal axe of the earth, 3841
Sugawara, M. Excited states of elementary particl and the quantization of elementary particles, 3860
Sugawara, M. and Minami, S. The mass variation wit velocity in the Bopp's unitary field theory. II 2948
Sugawara, T. On the atomic distribution curves fo liquids. II. False details in the atomic distributio curves and their discrimination, 3921. *See als* Kanda, E., 3920
Sugden, T. M. *See* James, C. G., 4003
Sugihara, T. *See* Arnold, J. R., 5677
Sugihara, T. T. and Libby, W. F. Negative pion activation of bromine, 1224
Sugihara, T. T., Wolfgang, R. L. and Libby, W. F Large thin-wall Geiger counter, 6879
Sugita, M. *See* Saitô, N., 1596
Sugita, T. *See* Yamaka, E., 6312
Sugiura, Y. *See* Uyeda, R., 2253
Suhner, F. *See* de Mallemann, R., 1231, 4937, 7809
Suhrmann, R. and Kangro, C. On the semiconductin properties of the systems potassium-antimon caesium-antimony, potassium-indium, caesiu indium, 6042
Suhrmann, R. and Schulz, K. Electronic interactio between chemisorbed molecules and adsorbing su face, 6300
Suita, T. Directional dielectric breakdown in sing crystals, 8438. *See also* Yamanaka, C., 6826
Sukharevskiĭ, Yu. M. *See* Ageeva, N. S., 1187

tan, F. S. A. Two dimensional diffusion phenomena in crystal growth from solution, 2041. *See also* Korndorffer, A., 2044
zer, P. Distribution of intensities of a continuous absorption spectrum as a function of wave number and temperature, 2344
zer, P. and Wieland, K. Intensity distribution of a continuous absorption spectra in relation to temperature and wave number, 4697
by, W. H. *See* Frick, F. C., 707
mers-Gill, R. G. *See also* Haslam, R. N. H., 2706
mers-Gill, R. G., Haslam, R. N. H. and Katz, L. Photoneutron cross sections in silicon and calcium, 2708
awaka, S. *See* Utiyama, R., 2945
dström, M. Some statistical problems in the theory of servomechanisms, 578
, P. K. and Majumdar, K. The absorption spectrum of PbBr molecule in the ultraviolet region, 3121
duts, A. A method of measuring the complex dielectric constant and permeability in the hyperfrequency region, 5460. The Faraday effect in conductors and semiconductors, 5598
inov, Yu. A. On the functional equations of heat radiation in the presence of an absorbing and dispersive medium, 5436
yanarayana Rao, K. Rotational analysis of the columbium oxide bands, 736. Spin splitting of $^5\Sigma$ and $^6\Sigma$ electronic states, 2596. High multiplicity states in diatomic molecules, 3498
ichinskiĭ, M. M. Line width in the Raman spectra of some hydrocarbons. I, 774
kind, C. On the isotropic artificial dielectric, 2435
kin, A. On a method of measuring very small time intervals, 4631
cliffe, L. H. and Walsh, A. D. The ultra-violet absorption spectrum of nitric oxide, 3146
ierland, G. B. B. M. *See* Kessler, H. K., 4954; Stein, R. S., 3128, Stuart, A. V., 1826
ierland, J. G. *See* Goodman, L. E., 6678
ierland, K. L. The kinetics of adsorption at liquid surfaces, 2030. *See also* Ewers, W. E., 1418
n, N. *See* Sebba, F., 2795
a, G. On the changes of electrical conductivity of metals at the time of melting. II, 838. The hydrogen ion in aqueous solution, 1213. Chemical aspect of the electrical conductivity of metals and alloys, 6789. Some difficulties of the electron theory of metals, 7817
on, C. D. *See* Challice, C. E., 1975
on, D. J. *See* Crompton, R. W., 2508, 6901
on, L. E. *See* Coulson, C. A., 4955
on, P. M. The variation of the elastic constants of crystalline aluminum with temperature between 53°K and 773°K, 7988
on, P. P., Indyk, A. D. and Kriegel, W. W. Transition layers on glass surfaces and their relation to alkali content, 8154
on, R. B. *See* Mott, W. E., 6095
a, H. V-particle as a composite one, 465
, S. Hyperfine structure of the spectrum of gadolinium, 5947. Hyperfine structure of the spectrum of Al II. II, 8314
r, F. and Charpak, G. Demonstration of the emission of electrons from the outer rings of an atom, simultaneously with β-emission, 5020
ki, K. *See* Nakamoto, K., 1515
, H. J. and Gibbs, D. S. A recording mercurial nanometer for the pressure range 0-760 mm of mercury, 2982
hnikov, S. V. Properties of monocrystalline photoresistivities of cadmium sulphide when excited by Röntgen rays, 6053
berg, T. *See* Rudstam, G., 5826
lo, V. A. On a problem of diffraction, 5419
onius, P. On the coherent scattering of light by an electrostatic field according to the Dirac hole theory, 883
onius, P. and Waller, I. On the rôle of spin in the non-relativistic theory of the scattering of radiation, 392
son, H. and Odengrim, K. A new method of measuring small refractive index differences, 1487
olov, L. M. Relations between moments of inertia and rotation frequencies of isotopic molecules, 7016
Swallow, J. C. *See* Gaskell, T. F., 2091
Swamy, H. N. Absorption spectra of organic substances in the liquid and solid states. II. Cresols, 3124; III. Some substituted benzene compounds, 3125
Swan, J. B. and Hill, R. D. Radioisotopes of osmium, 1055. Internal conversion in the L subshells, 7901
Swan, J. B., Portnoy, W. M. and Hill, R. D. Radioactivity of Pt^{191} and Pt^{193m}, 4306
Swan, P. The elastic scattering of neutrons by tritons at 14 MeV, 3606. The elastic scattering of neutrons by tritons and of protons by ^{3}He, 7155
Swank, R. K. *See also* Phillips, H. B., 8332
Swank, R. K. and Buck, W. L. The scintillation process in plastic solid solutions, 7592
Swann, C. P. and Swingle, J. F., Jr. A radiofrequency ion source, 915
Swanson, D. R. Interpretation of high energy p-p scattering, 2501. Polarization effects in nucleon-nucleon scattering, 2502
Swanson, J. *See* Landauer, R., 7671
Swartz, J. C. and Trischka, J. W. Radiofrequency spectra of Li^{6}F^{19} by the molecular beam electric resonance method, 743
Swarup, P. *See* Krishnaji, 6632
Swenson, C. A. The blocked capillary method for determining melting pressures; the melting curve of helium from 1·5° to 4°K, 2412
Swensson, J. Are the forbidden lines of neutral iron and ionized nickel present in the solar spectrum? 4566
Swensson, J. W. *See* Knuckles, C. F., 5255
Swift, G. Simultaneous gamma-ray and neutron logging, 3760
Swihart, J. and Akeley, E. Axial motion of electrons in a linear accelerator with $\beta = 1$, 6833
Swinbank, W. C. The criterion of atmospheric turbulence, 5239
Swingle, D. M. Nomograms for the computation of tropospheric refractive index, 4520
Swingle, J. F., Jr. *See* Swann, C. P., 915
Swings, P. Identification and astronomical significance of the forbidden lines of iron and other metals, 115. The physics of comets. Introduction, 6392. Abundances in the Wolf–Rayet stars, 6437. *See also* Rosen, B., 6436
Sworski, T. J. Some effects of cobalt gamma-radiation on aqueous benzene solutions, 1222. Hydrogen peroxide formation by cobalt gamma-radiation, 3689
Syeles, A. M. *See* Adams, E., 320
Sykes, K. W. *See* Long, F. J., 2008–9
Symon, K. R. and Poplawsky, R. P. An electronic differential analyzer, 2137
Synge, J. L. Primitive quantization in the relativistic two-body problem, 2184
Szabó, Z. G. and Lakatos, B. On the melting points of transition metals, 1580
Szalay, L. von. *See* von Szalay, L.
Szamosi, G. Note on the connections between elementary particles, 1373. On the shell structure of nuclei. I, 6178
Szegö, G. Conformal mapping related to torsional rigidity, principal frequency, and electrostatic capacity, 2891
Székely, A. The effect of small a.c. voltages on the discharge current in gas-filled grid-controlled electron tubes, 8462
Szendrei, M. E. *See* Birks, J. B., 6890
Szwarc, M. *See also* Ladacki, M., 1000, 8749
Szwarc, M. and Williams, D. Studies of the variations in bond dissociation energies of aromatic compounds. II. Substituted bromobenzenes, 8750

Tabor, D. The hardness of metals, 1198. The mechanism of rolling friction, 1996. *See* Bowden, F. P., 4400
Tabuchi, D. Dispersion and absorption of sound in mixture of gases, 675
Taft, E. *See also* Apker, L., 887, 2461
Taft, E. and Apker, L. Photoelectric emission associated with β-band absorption in alkali iodides, 232. Photoemission from cesium and rubidium tellurides, 2460
Taft, E. A. *See* Apker, L., 233

Tagaya, M., Nenno, S. and Nishiyama, Z. On the Fe-Cr superlattice, 547
Taglang, P. *See* Meyer, A. J. P., 1322, 5605
Tagliaferri, G. *See* Succi, C., 7745, 7761
Tai, C. T. *See* Middleton, R., 3586
Tait, R. I. and Chalklin, F. C. A direct-reading microdensitometer, 8306
Takabayasi, T. On the formulation of quantum mechanics associated with classical pictures, 8242
Takagi, S. Note on the statistical theory of the meson shower, 306. *See also* Sakihama, K., 300
Takahashi, N. *See* Trillat, J.-J., 3642, 5733
Takahashi, T. *See* Watanabe, H., 4206
Takahashi, Y. Meson current around the nucleon, 46
Takahashi, Y. and Umezawa, H. On the self-stress, 8231
Takahasi, H. *See* Kambe, K., 1613
Takakubo, K. *See* Unno, W., 3821
Takakura, T. A method of analysis of the directivity of solar radio emission from sunspots, 3807. On the directivity of solar radio emission from the sunspots, 7398
Takamura, J. *See* Nishimura, H., 3652
Takayama, K. *See* Kojima, S., 1666
Takayanagi, K. On the inelastic collision between molecules. I, 3029
Takebe, H. *See* Kotani, T., 2741
Takeda, E. *See* Sakata, H., 6190; Yoshida, S., 6090
Takei, C. *See* Nonaka, I., 256
Takemoto, S., Dazai, T. and Chiba, R. Angular distributions of protons from $\mathrm{Na}^{23}(d, p)\mathrm{Na}^{24}$, 8683
Takesita, K. *See* Nonaka, I., 256
Taketani, M. *See also* Machida, S., 50
Taketani, M., Machida, S. and Ônuma, S. Meson theory of nuclear forces, 49
Taketani, M., Ônuma, S. and Koide, S. On the nuclear forces and the ground state of deuteron, 48
Takeuchi, R. On average noise level in street, 717. The analysis of the sound field in a room by the image source method. II, 719
Takeyama, H. On the molecular spectra emitted by mercury vapour, 1503
Takibaev, Zh. S. The generation of star producing particles in a dense substance at a height of 25 km, 5559
Takibaev, Zh. S. and Kazieva, B. K. Production of slow mesons in the glass of photographic plates, 1719
Takibaev, Zh., Ostyakov, M. and Kaipov, D. The absorption of the star-producing component of cosmic rays at an altitude of 4000 m, 5558
Taksar, I. M. *See* Kunin, P. E., 5850, 5852, 6129
Talbot, S. A. and Kuffler, S. W. A multibeam ophthalmoscope for the study of retinal physiology, 2115
Talbott, F. L. and Heydenburg, N. P. Gamma-ray resonances in the alpha-particle bombardment of beryllium and boron, 4346
Talley, R. M., Lowe, D. S. and Scanlon, W. W. Infrared molecular emission excited in a glow discharge, 1663
Talmi, I. The evaluation of the energy matrix of the tensor forces, 2959. Spins and parities excited states in even-even nuclei. II, 6174. Matrix elements of β-decay in *jj* coupling, 7094. *See also* Racah, G., 4957
Tamada, K. On the detachment of shock wave from the leading edge of a finite wedge, 3930
Tamburino, S. M. and Stella, A. Determination of the radioactivity of a pegmatite of Delianova by means of nuclear emulsions exposed to layers of pulverized and compressed rock and to thin sections, 2641. Radioactivity of Etna lava, 7855
Tamm, I. I. *See* Ryabinin, Yu. N., 5406
Tamm, K. Measurements of sound absorption in water and aqueous solutions of electrolytes in the frequency range 5 kc/s to 1 Mc/s, 5917
Tamura, M. and Tutihasi, S. Silver bromide polycrystalline film prepared by precipitation method for photoconductive measurements, 6799
Tamura, T. *See* Fujimoto, Y., 473, 8484; Machida, S., 451
Tanabe, Y. The change of conductivity of metals in strong magnetic fields, 4108
Tanaka, H. *See* Ito, D., 53
Tanaka, K. and Fukuyama, I. On the metastable phase change of ammonium nitrate, 8362
Tanaka, K. and Hashimoto, H. Construction of universal electron diffraction microscope and it optical features, 8445
Tanaka, S. Measurement of the thickness of meta plate by ultrasonic harmonic method. I. On the condition of the thickness resonance, 3934; II. Electronic operation and results of a field inspection 3935. *See also* Ôyama, T., 3957
Tanaka, S. and Yamada, S. Measurement of the thickness of metal plate by ultrasonic harmonic method III. On the resonance of lower harmonic order, 3936
Tanaka, T. *See* Watanabe, T., 827
Tanaka, Y. On the new absorption bands of the oxygen molecule in the far ultraviolet region, 757. On th Miescher–Baer emission bands in the far ultraviole region, 3994. On the emission bands of the N molecule in the vacuum ultraviolet region, 5384 Extension of the $N_2^+(C \rightarrow X)$ bands in the far ultraviolet region, 8318
Tanenbaum, M. *See also* Pearson, G. L., 4816
Tanenbaum, M. and Maita, J. P. Hall effect and conductivity of InSb single crystals, 8410
Tanifuji, M. *See* Muto, T., 2954
Tannenbaum, E., Coffin, E. M. and Harrison, A. The far ultraviolet absorption spectra of simpl alkyl amines, 2354
Tannenwald, P. E. Disintegration of helium b 90-MeV neutrons, 2722. *See also* Artman, J. O 8548
Tárczy-Hornoch, A. The calculation of magneti declination in the Carpathian basin, 1275
Tarkhova, T. N. *See* Pasheva, Z. P., 8797
Tarnay, F. and Barthès, E. Light sources and colours physical and practical aspects, 785
Tartaglione, E. *See* Carrelli, A., 4412
Tartakovskiĭ, B. D. and Efrussi, M. M. On th measurement of sound absorbing material in resonance chambers, 2296
Tarte, P. Rotational isomerism as a general propert of alkyl nitrates, 132
Taschek, R. F. *See* Martin, H. C., 5078
Tatarskiĭ, V. I. *See* Krasil'nikov, V. A., 6384
Tate, J. F. and Williams, E. S. Assay of mixed radioisotopes, 2644
Tatibouët, F. *See* Barchewitz, P., 6999
Tatsumi, T. Remarks on "Stability of the lamina parabolic flow," 61. Note on discrepancies betwee two theories on the stability of plane Poiseuill flow, 1408
Taurel, L. Experimental results of the study of th scattering of light by a single crystal of sodiu chloride, 783. Basis of a molecular theory of th Rayleigh scattering in crystals, 5777. *See als* Marck, P., 5427
Taurel, L. and Champier, G. Experimental results o a study of the scattering of light by natural an synthetic crystals of sodium chloride, 7613
Tauzin, P. Theory of negative photophoresis. Supplement to two previous notes, 1477. Comparison o the luminous energies present at the two faces in th interior of a lamina, illuminated at normal incidenc by a parallel pencil, 3077
Tavares, A. Dias. *See* Dias Tavares, A.
Tavernier, P. and Prache, P. Influence of pressure the resistivity of a thermistor, 812
Taylor, A. E. *See also* Randle, T. C., 7914
Taylor, A. E. and Wood, E. Neutron total cross sectio for lead between 37 and 156 MeV, 453. Neutro total cross sections between 30 and 153 MeV, 4361
Taylor, A. M. *See* Archard, J. F., 168
Taylor, C. *See* von Dardel, G., 3363
Taylor, C. A. *See* Hanson, A. W., 7316; Hughes, W 5209
Taylor, D. Recent instrument developments i England, 4875
Taylor, E. W. The ultraviolet microscope, 4048
Taylor, G. An experimental study of standing waves 6518. Dispersion of soluble matter in solve flowing slowly through a tube, 6530
Taylor, G. I. Formation of a vortex ring by giving impulse to a circular disk and then dissolving it away 2233

LOR, H. A. *See* Wijnen, M. H. J., 2788

LOR, H. O. Tube method of measuring sound absorption, 704. Early work on the instrumental ear, 2866. Note on acoustic impedance, 5924

LOR, H. S. and Glasstone, S. [Eds.]. A treatise on physical chemistry. Volume 2. States of matter, 5147

LOR, J. Detonation in condensed systems, 2003

LOR, J. G. V. and Haslam, R. N. H. Cross section for the reaction $Br^{81}(\gamma, \alpha)As^{77}$, 446

LOR, J. H., Benedict, W. S. and Strong, J. Infrared spectra of H_2O and CO_2 at 500°c, 1531

LOR, N. W. A simplified form of the relativistic electromagnetic equations, 22. The relativistic electromagnetic equations in a material medium, 2929

LOR, R. *See also* Coulson, C. A., 344

LOR, R. and Coulson, C. A. Studies in graphite and related compounds. III. Electronic band structure in boron nitride, 346

LOR, R. J. The dissipation of kinetic energy of the lowest layers of the atmosphere, 4500

LOR, W. and Weiss, J. The rate constant of the reaction between hydrogen peroxide and ferrous ions, 8730

LOR, W. E. *See also* Roth, L., 1244*

LOR, W. E., Odell, N. H. and Fan, H. Y. Grain boundary barriers in germanium, 845

LOR, W. H. X-ray studies of metal structures, 487

LOR, W. J. Formulation of isotopic splitting in terms of the reciprocal kinetic energy matrix, 4945. Fourier representation of Buerger's image-seeking minimum function, 7318

AKI, H. and Kuwabara, S. A study of substances with the structure of a spinel type, 1264

, G. K., Sparks, M. and Buehler, E. Single-crystal germanium, 858

DALE, T. S. and Rorschach, H. E., Jr. The paramagnetic effect in superconductors, 6795

LE, R. S., Wood, J. E. and Florentin, J. J. The temperature variation of the magnetization of nickel in low and moderate fields, 1759

ITSOONIAN, E. and Chalmers, B. Further observations on the macromosaic structure of tin single crystals, 7273

HMANN, T. and Wigner, E. P. Electromagnetic field expansions in loss-free cavities excited through holes, 3449

LAC, J. *See also* Bouissières, G., 7102; Falk-Vairant, P., 5681; Victor, C., 1897

LAC, J., Riou, M. and Desneiges, P. Determination of the period of the 27 keV electric-dipole radiation emitted in the transition $Pa^{231} \xrightarrow{\alpha} Ac^{227}$, 7893

GDI, V. L. *See also* Gell-Mann, M., 7146; Hsiao, C. A., 5707; Sánchez del Río y Sierra, C., 073

NIN, R. V. and Kuritsȳna, E. F. Effect of a demagnetizing field on magnetic viscosity, 5576

ER, A. H. *See* Metropolis, N., 6026

ER, E. *See* Metropolis, N., 6026

Z-Plasencia, M. H. Calorimetric measurements f the energy of X-rays. Ionization of the ir and of rare gases. New determinations of onstants: Energy of formation of a pair of ions, ε. fficiency of fluorescence, μ_s. Amplitude of discontinuities of absorption, δ, 6830

OW, J. On the lattice expansion of crystals by added toms, 7287

ER, G. M. *See* Bloembergen, N., 3436

RLEY, H. N. V. Statistical mechanics and the artition of numbers. II. The form of crystal urfaces, 2049

LETON, D. H. *See* Castner, S. V., 1057

LETON, I. M. *See* Rollin, B. V., 4800

LIN, H. A. *See* Mahan, A. I., 4689

AM, D. J. *See* Bleuler, E., 4996, 5056; Gailar, O., 382

NT, R. M. Two methods of measuring the degree f a microscope stage, 2974. *See also* Herz, A. J., 380; Tidman, D. A., 5717

LDAM, C. A. *See also* de Boer, J., 6549

LDAM, C. A. and de Groot, S. R. On the ground ate of a model for compressed helium, 2255. On e polarizability of a model of the compressed lium atom, 2256. A calculation of internal kinetic energy and polarizability of compressed argon from the statistical atom model, 2257

Terada, J. Crystal structure of the Ba, Sr and Ca triple carbonate, 4487

Teranishi, R. and Decius, J. C. Infrared absorption of solid N_2O_5, 6626

Terao, N. On the refraction of cracks due to shocks, 1950. A statistical treatment of the resistance of glass to rupture. On the influence of temperature, 1987*. The relation between the resistance to rupture and the extent of cracking in glass, 7999. The resistance to rupture of glass—the influence of humidity, 8000

Terenin, A. N. and Ermolaev, V. L. Sensitized phosphorescence of organic molecules. Intermolecular transfer of energy with excitation of the triplet level, 6647

Terent'eva, L. S. *See* Tsvetkov, V. N., 7499

Terentiuk, F. *See* Blüh, O., 921

ter Haar, D. Statistics of the three-dimensional ferromagnet. II. Comparison of various approximation methods, 2535. The isotherms of an imperfect gas, 4069. A molecular sum rule, 6987. The law of corresponding states, 8277. The vapor pressure and entropy of liquid He^3, 8372. *See also* Martin, B., 2534

ter Haar, D. and Green, C. D. The statistical aspect of Boltzmann's *H*-theorem. 3278

ter Horst, D. T. J. and Rutgers, G. A. W. Spectral radiant intensity and temperature of the high intensity alternating carbon arc, 8431

Ter-Martirosyan, K. A. *See* Karamyan, A. S., 3518

Ternov, I. M. *See* Sokolov, A. A., 8224

Terpstra, T. J. A confidence interval for the probability that a normally distributed variable exceeds a given value, based on the mean and the mean range of a number of samples, 2901

Terrana, E. On the elimination of some errors of angular measurements, 1354

Terrani, S. *See* Lovati, A., 7761

Terrien, J. Method for comparing an end-gauge and a slip-gauge, 2220. Co-ordination of the photometric units at the Bureau International des Poids et Mesures, 3081

Terris, A. *See* Rado, G. T., 959

Tertian, L. *See* Legrand, C., 3741; Trillat, J.-J., 1859

Tertian, R. *See* Legrand, C., 3741; Trillat, J.-J., 6192, 8163

Terwilliger, K. M. *See* Jones, L. W., 7931

Tesche, O. A. A contribution to the determination of signs in the Fourier analysis of crystals, 8790

Teslyuk, M. Yu. *See* Gladȳshevskiĭ, E. I., 5217

Tessman, J. R. The parallel susceptibility of an antiferromagnet at low temperatures, 960

Tester, D. A. *See* Kipling, J. J., 3695

Tetenbaum, S. J. Six-millimeter spectra of OCS and N_2O, 741

Teucher, M. On the altitude dependence of the star size distribution and the energy spectrum of the nucleon component at $\lambda = 50°$n, 4898. *See also* Gottstein, K., 5101

Teves, M. C. and Tol, T. Electronic intensification of fluoroscopic images, 1319

Teviotdale, A. Zener's treatment of ferromagnetism, 2536. *See also* Bitter, F., 7558

Tewes, H. A. and James, R. A. Proton induced reactions of thorium—fission yield curves, 1108

Texereau, J. Application of phase contrast to the study of small polishing defects of optical surfaces formed by different techniques, 3217

Thackeray, A. D. and Wesselink, A. J. Distances of the Magellanic clouds, 5282

Thaler, R. M. *See* Breit, G., 1843, 4278

Thambyahpillai, T. and Elliot, H. World-wide changes in the phase of the cosmic-ray solar daily variation, 7774

Tharrats Vidal, J. M. Dynamical study of groups of transformations, 1

Thedieck, R. Contribution to the knowledge of the working of point-contact transistors, 8416

Thees, R. *See* Krebs, H., 8074

Theimer, O. On multilayer adsorption isotherms, 5177. *See also* Renner, H., 1550

Thellung, A. On the hydrodynamics of non-viscous fluids and the theory of helium II. II, 6721. *See also* Kronig, R., 3255

Theobald, J. K. Investigation of back diffusion of photoelectrons in various standard gases as it affects secondary electron emission coefficients, 3398

Therraux, C. Meson production with latitude cut-off, 8490

Theus, R. *See* Scherrer, V. E., 4365

Thewlis, J. A graphical method for the determination of the unit-cell dimensions of non-cubic materials from X-ray powder photographs, 7309

Thewlis, J. and Hutchinson, T. S. The interpretation of X-ray powder photographs of crystals of low symmetry, 8782

Thibaud, J. The degree of coherence in the interior of a radioactive distribution, 3553

Thie, J. A. Photomesons from the deuteron, 449

Thiessen, G. The magnetic field strength in sunspots, 5838. The effect of interstellar polarization in the solar corona, 5839

Thirring, W. On the divergence of perturbation theory for quantized fields, 4592

Thirsk, H. R. The structure and orientation of calomel formed on liquid mercury by anodic polarization, 3713

Thiry, Y. On a generalization of Schwarzschild's problem in a unified theory, 2164

Thode, H. G. *See* Fleming, W. H., 6193; Walker, W. H., 4971; Wanless, R. K., 4984; Wiles, D. R., 3608

Thomas, D. A. *See* Broyles, C. D., 2677

Thomas, D. G. and Staveley, L. A. K. A study of the supercooling of drops of some molecular liquids, 3013

Thomas, E. E. *See* Vogel, F. L., 5774

Thomas, G. E., Jr. *See* Harris, S. P., 7186*; Muehlhause, C. O., 4396

Thomas, G. R. and Lichtin, N. N. Apparatus for controlled atmosphere research, 2036. An inexpensive recording differential manometer suitable for reaction kinetics measurements, 8251

Thomas, H. C. *See* Gaines, G. L., Jr, 4436; Merriam, C. N., Jr, 2000

Thomas, J. P. *See* Dufour, C., 8450

Thomas, L. F. *See* Sharbaugh, A. H., 2347

Thomas, L. H. The stability of plane Poiseuille flow, 7486. *See also* Sheldon, J., 2897; Zondek, B., 5882

Thomas, P. H. Absorption and scattering of radiation by water sprays of large drops, 1575

Thomas, P. J. *See* Green, J. H. S., 3676

Thomas, R. G. An analysis of the energy levels of the mirror nuclei, C^{13} and N^{13}, 1030

Thomas, R. G. and Lauritsen, T. Magnetic lens spectrometer measurements of the radiations from light nuclear reactions, 1112

Thomas, R. H. *See* Littler, D. J., 5117; Lockett, E. E., 4982

Thomas, R. N. The physical theory of meteors. III. Conditions at the meteor surface, 2148

Thomas, T. R. *See* Welsh, H. L., 6660

Thomescheit, A. Difference formulae for the calculation of optical aberrations of meridional bundles, with special reference to systems having telecentric ray paths in the image space, 105. The light distribution in geometric-optical image patterns in arbitrary image planes for optical systems with spherical surfaces, 7545

Thompson, A. B. *See* Marshall, I., 1958

Thompson, D., Vilbrandt, F. C. and Gray, W. C. The effect of insonation on the specific reaction rate constant in the acid hydrolysis of ethyl acetate, 5746

Thompson, D. O. Creep of zinc single crystals, 1196

Thompson, F. W. and Ubbelohde, A. R. Septum permeation of hydrogen from flames, 3635

Thompson, H. W. *See* Boyd, D. R. J., 3495; Glusker, D. L., 7570; Mills, I. M., 6638; Pickworth, J., 6639

Thompson, J. E. *See* Sucksmith, W., 8578

Thompson, J. H. C. Instability and melting of the alkali halides, 4471

Thompson, M. C., Jr. *See* Greenspan, M., 2294

Thompson, N. Dislocation nodes in face-centred cubic lattices, 7297

Thompson, R. W., Buskirk, A. V., Etter, L. R., Karzmark, C. J. and Rediker, R. H. The disintegration of V^0 particles, 5720. An unusua example of V^0 decay, 7172

Thompson, S. G. *See* Hulet, E. K., 3547; Rasmussen, J. O., Jr, 1877

Thomsen, J. S. Coulomb friction with several blocks 7476

Thomson, A. C. *See* Bergmann, P. G., 6494

Thomson, D. M. Evidence for a new level in Be^7, 110

Thomson, J. Physics in the electronic valve industry 8461

Thomson, R. *See* Bergmann, P. G., 2167

Thon, W. *See* Motz, H., 6852

Thorn, R. J. and Simpson, O. C. Temperature gradien in inductively heated cylinders, 3441. Spectra emissivities of graphite and carbon, 5370

Thorn, R. N. and Waniek, R. W. A method o measuring short beta-decay lifetimes, 6195

Thorndike, A. M. Mesons. A summary of experimental facts, 7948. *See also* Fowler, E. C., 717 7175; Fowler, W. B., 8688

Thornton, S. The measurement of the absolu viscosity of anomalous fluids. I. The measuremen of the time-dependence of viscosity of thixotropi materials, 2987

Thornton, S. and Rae, D. The measurement of th absolute viscosity of anomalous fluids. II. A comparison of absolute viscosity measurements o instantaneously thixotropic fluids, 2988

Thorsen, V. The splitting of spectral terms, 7557

Thouvenin, J. *See* Demers, P., 6369

Thrush, B. A. *See* Norrish, R. G. W., 3246, 8342

Thulin, S. *See* Alburger, D. E., 4300; Atterling, H. 7086

Thurlow, G. G. Measurement of surface temperatur 4767

Thurn, H. The third and fourth maxima of the showe curve, 1722. Further measurements of the showe production curve, 4895

Thurnauer, H. and Roberts, S. [Eds.]. Digest of th literature of dielectrics. Vol. XV—1951, 828

Thurston, E. G. Theoretical sensitivity of a transvers loaded, circular bimorph transducer, 1462

Thurston, G. B. Periodic fluid flow through circula tubes, 673. Apparatus for absolute measurement c analogous impedance of acoustic elements, 705

Thurston, G. B. and Martin, C. E., Jr. Periodic flui flow through circular orifices, 2277

Ticho, H. K. The absorption mean free path of larg hard showers in air, 308

Tidman, D. A., Davis, G., Herz, A. J. and Tennen R. M. Delayed disintegration of a heavy nuclea fragment. II, 5717

Tidman, D. A. and Hodgson, P. E. The mean energ of three-track nuclear disintegrations produced b cosmic-ray particles, 1733

Tietz, T. Movable critical points of a nonlinear wav equation, 4621

Tihonov, A. N. and Skugarevskaya, O. A. On th establishment of an electric current in a nonhom geneous stratified medium, 4796

Tikhonov, A. N. and Énenshteĭn, B. S. The influen of the time lag of electric currents in the earth o the measurement of the field in electric depth soun ing, 7342

Tillieu, J. and Guy, J. Comparison of the two princip methods of calculating atomic and molecul polarizabilities, 7851

Tillman, J. R. and Henderson, J. C. Some therm properties of point-contact germanium diodes, 76

Tillmann, M. *See* Kern, R., 5773

Timnick, A. *See* Cohen, B. L., 5701

Ting Yu. *See* Yu Ting, 2618

Tinlot, J. *See* Roberts, A., 6236

Tiomno, J. *See* Fialho, G. E. A., 2737

Tipper, C. F. H. *See* McEwan, A. C., 502, 3680

Tiruvenganna Rao, P. The complex band spectrum diatomic manganese chloride in the visible regio 3107

Titterton, E. W. Possibility of the quaternary fissi of uranium-235, 1141. Capture γ-rays from t Li$^7(p, \gamma)$ reaction at the 440-keV resonance, 7891

erton, E. W. and Brinkley, T. A. The forbidden nature of the reaction $^{6}\mathrm{Li}(\gamma, d)^{4}\mathrm{He}$ for γ-rays of energies up to 17·6 MeV, 3597. Excitation function for the (γ, p) and (γ, T) reactions in lithium-7 for energies up to 24 MeV, 4356. Cross sections for the reaction $^{7}\mathrm{Li}(\gamma T)^{4}\mathrm{He}$ at 6·13, 14·8 and 17·6 MeV, 7928
erton, E. W. and Wilson, R. S. Pulse amplitude analysis in nuclear physics, 5542
man, J. Thermal energy relaxation length of Ra–Be neutrons in water, 4394
ari, G. S. *See* Ramaiah, N. A., 4123
kstra, H. H. The influence of pressure on the viscosity of liquid helium I, 2417
ilem, J. *See* Bouchez, R., 7835
as, C. W., Eisenberg, M. and Wilke, C. R. Diffusion and convection in electrolysis—a theoretical review, 7242
n, M. C. The transformation properties of internal coordinates under covering operations, 2601. The statistical interpretation of polarization data in Raman spectra, 6659
a, M. Diffusion on the Fermi-surface and the conductivity of metals, 6037
d, S. S. Low temperature heat capacities and entropies at 298·16°K of magnesium orthotitanate and magnesium dititanate, 3268
d, S. S. and Lorenson, R. E. Heat capacities at low temperatures and entropies at 298·16°K of orthotitanates of barium and strontium, 3267
rović, M. M. Some observations on the operation of a Nier-type ion-source for a mass spectrometer, 4863. A method of measuring isotopic abundances with a mass spectrometer in the presence of residual peaks, 4970
ler, M. A new treatment of reflection and total reflection, 5373
yasu, K. On damage to specimens by shadowing bombardment. I. Experiment. II. Calculation, 7981. Contour lines on the shadowed side in the electron microscope, 7982
T. *See* Teves, M. C., 1319
nsky, S. The micro optical examination of metal surfaces turned by diamond tools, 3215. Shadow microscopy for measurement of height, 4049. Specialized microscopical techniques in metallurgy, 1400
nsky, S. and Omar, M. Evaluation of small radii of curvature using the light-profile microscope, 1401. Observations on slip found in a diamond, 8047
ert, C. W. *See* Hertel, P., Jr, 7660
oek, H. A. On the theory of the directional distribution and the polarization of beta and gamma rays emitted by orientated nuclei, 5025. *See also* de Groot, S. R., 8386
oek, H. A. and Cox, J. A. M. Angular distribution and polarization of gamma radiation emitted by oriented nuclei, 7100
oek, H. A. and de Groot, S. R. A discussion of the first law of thermodynamics for open systems, 279
achev, S. S. *See* Zaslavskiĭ, A. I., 6316
estrup, A. V. *See* Walker, R. L., 5102
ygo, K. B. Photo-e.m.f.'s in a semiconductor possessing single-sign photoconductivity, 5472
oi, N. A. and Feofilov, P. P. Decay of the luminescence of ruby, 6648
sini, G. *See* Setti, R. L., 8505
szewski, J. J. *See* Nickerson, D., 3195
oulian, D. H. *See* Brown, B. M., 1034
s, N. C. A low-temperature X-ray powder camera, 38
hima, Y. *See* Umeda, K., 5869
a, G. and Nisi, H. On the Raman effect in the aqueous solutions of some nitrates of rare earth elements, 153
a, K. States of solid methane as inferred from nuclear magnetic resonance, 3474. The state of solid methane as inferred from nuclear magnetic resonance, 4239
uka, T. *See* Slifkin, L., 1959
a, P. Contributions on the electrical conduction of coloured and uncoloured alkali halide crystals, 2445
ins, F. S. *See* Fred, M., 2616
nson, T. B. Temperature dependence of low frequency fluctuations in thermionic emitters, 6908
Tomlinson, T. B. and Price, W. L. Theory of the flicker effect, 8420
Tomono, M. Direct current characteristics of the selenium rectifier. I. Theory of rectification, 8423
Tompa, H. Quasi-chemical treatment of mixtures of oriented molecules, 3008. *See also* Bamford, G. H., 7976
Tompkins, A. *See* Turkevich, A., 2728, 4299
Tompkins, F. C. *See* Jacobs, P. W. M., 2001, 2017
Tongiorgi, V. Cocconi and Edwards, D. A. Neutrons produced in the absorption of negative π-mesons at rest, 470
Tonks, L. The complete solution of the one-velocity diffusion problem at intermediate and large distances, 476
Tønnesen, T. H. On the distribution of transistor action, 219
Toraldo Di Francia, G. *See* Di Francia, G. Toraldo
Torikai, Y. Transmission of ultrasonic waves through a plane plate made of viscoelastic material immersed in a liquid medium, 3940
Torikai, Y. and Negishi, K. The application of the phase method in visualizing ultrasonic waves, 2286
Torizuka, Y. Anomalous resonance absorption in cobalt ferrite and Co–Zn binary ferrites, 4211. *See also* Okamura, T., 1747, 2547, 4207–8, 4210, 4212, 4214
Torkington, P. Interactions in vibrating molecules, 1812
Török, T. Low-voltage spark generator for spectrographic analysis, 7556
Torpey, W. A. *See* Trevoy, D. J., 8276
Torroja, J. M., Amorós, J. L. and Díaz, E. P. A new camera for direct recording of the reciprocal lattice, 5204
Tourin, R. H. Infrared emission and absorption of thermally excited carbon dioxide, 122
Touschek, B. *See* Chisholm, R., 6172
Touschek, B. F. *See* Burton, W. K., 3853, 8213
Tousey, R. Rocket spectroscopy, 3815. *See also* Koomen, M., 2109
Tousey, R. and Koomen, M. J. The visibility of stars and planets during twilight, 2915
Towler, J. H. and Guy, W. A simplified method of calibrating infra-red spectrometers, 1492
Townes, C. H. *See* Dousmanis, G. C., 8622; Miller, S. L., 4714, 4947; Sanders, T. M., Jr, 4022
Townley, J. R. *See* Charnley, A., 6550
Townsend, J., Weissman, S. I. and Pake, G. E. Hyperfine structure in the paramagnetic resonance of the ion $(\mathrm{SO_3})_2\mathrm{NO}^{--}$, 2548
Townsend, J. W., Jr. Radiofrequency mass spectrometer for upper air research, 558
Tracy, J. F. The scattering and absorption of π^{+} mesons by aluminum, 7958
Trainor, L. *See* Corinaldesi, E., 4140, 7462
Trainor, L. E. H. and Wu, T.-Y. Symmetry requirements in electron scattering by an atom, 2198
Trambarulo, R. *See also* Ghosh, S. N., 2603
Trambarulo, R., Ghosh, S. N., Burrus, C. A., Jr and Gordy, W. The molecular structure, dipole moment, and g factor of ozone from its microwave spectrum, 5644
Tranter, C. J. Temperature rise in a heat-producing solid behind a surface defect, 4052
Trappeniers, N. *See* Prigogine, I., 3916–17
Traub, A. C. A graphical demonstration of white light interference, 2382
Travers, S. Limitation of gradients and their logarithmic derivatives in shock waves by Chapman's formulae, 1449. The calculation of the thickness of shock waves in argon, 5340
Traving, G. Experimental examination of the systematic errors of equivalent widths, 5950
Treacy, P. B. Alpha particles from $^{10}\mathrm{B} + \mathrm{D}$, 4350
Treadwell, E. E. E. *See* Lippold, O. C. J., 570
Tredgold, R. H. The application of Kirkwood's approximation to the calculation of intrinsic magnetization, 6929. *See also* Bacon, G. E., 4907
Trefall, H. A counting rate meter for recording of the cosmic-ray intensity, and some general remarks on the statistics of the ratemeter, 6913. Cosmic-ray intensity and the temperature of the upper atmosphere, 7752. *See also* Trumpy, B., 8502
Trehan, P. N. *See* Sarna, H. R., 3288

Treille, P. *See* Chanson, P., 2530; Price, B. T., 3407

Treiman, S. B. Effect of equatorial ring current on cosmic-ray intensity, 1729. The cosmic-ray albedo, 7756. *See also* Simpson, J. A., 6126

Trembley, J. *See* Crussard, J., 5560, 7173

Tremellen, K. W. *See* Kitchen, F. A., 2575

Trenam, R. S. Paramagnetic resonance in four double nitrate salts, 4911. The nuclear magnetic moment of ^{57}Fe, 6181. *See also* Baker, J. M., 4288; Bleaney, B., 1750, 6142

Trent, H. M. An alternative formulation of the laws of mechanics, 2968

Trent, P. T. *See* George, E. P., 6926

Trevoy, D. J. Studies in high vacuum evaporation. Projective and equilibrium vapor-liquid relationships for two binary systems over an extended range, 3021. *See also* Hickman, K. C. D., 3020, 3023

Trevoy, D. J. and Torpey, W. A. A vacuum anemometer, 8276

Trezona, P. W. Additivity of colour equations, 6680

Triebwasser, S. *See also* Dayhoff, E. S., 1848

Triebwasser, S., Dayhoff, E. S. and Lamb, W. E., Jr. Fine structure of the hydrogen atom. V, 1847

Trillat, J.-J. Electron microscopy and diffraction study of the behaviour of silver bromide under the action of fast electrons, 3643. *See also* Kassenbeck, P., 5128

Trillat, J.-J. and Takahashi, N. Electron diffraction study of Cu–Al alloys prepared by evaporation *in vacuo*, 3642. The recording electron diffractograph applied to the study of chemical and physical transformations, 5733

Trillat, J.-J. and Tertian, L. Study of radioactive minerals by combined electron-reflection radiography and autoradiography, 1859. Combined application of electronic reflection radiography and autoradiography to the study of radioactive minerals, 6192. Reflection electron radiography combined with autoradiography—application to the study of radioactive minerals, 8163

Trinh, N.-Q. Electric polarization and dipole moments, 7021

Trischka, J. W. On the internuclear distance and dipole moment of the LiF molecule, 1019. *See also* Goldberg, J. N., 1946; Luce, R. G., 1806; Swartz, J. C., 743

Trocheris, M. On a new selection rule possible for certain β-disintegrations, 6167

Troesch, H. A. and Grassmann, P. The distribution law of particle size from atomization, 6524

Troitskiĭ, V. S. On the sensitivity of a radio thermometer, 6731

Trolan, J. K. *See* Dyke, W. P., 2479, 6834

Trombe, F. The semi-industrial solar furnace of the Mont-Louis laboratory (Eastern Pyrenees), 802. Some details of the semi-industrial solar furnace at Montlouis, 1582. Experiments on the magnetic properties of metallic dysprosium, 4904. Metallic dysprosium and its magnetic properties, 7792

Trombe, F. and Foëx, M. Centrifugal furnace heated by solar energy, 184. Thermal expansion anomalies of ferromagnetic rare earth metals: gadolinium and dysprosium, 7624

Tronnier, A. W. The geometric optics of complex image-forming systems, 2312

Trost, A. Measurement of thicknesses under 1 mm with beta rays, 5310. *See also* Berthold, R., 2073

Trotman-Dickenson, A. F. Entropy changes in free radical reactions, 2778. *See also* Pritchard, G. O., 5167

Trowse, F. W. An apparatus for the photometric study of flash-initiated reactions, 5169

Trucco, E. On the stability of heavy nuclei in the strong-coupling limit of the pseudovector meson theory, 4963

Trueblood, K. N. *See* Mayer, S. W., 8789

Truell, R. *See also* Levy, S., 8602; Ying, C. F., 1165

Truell, R. and Bronzo, J. Ultrasonic attenuation measurements in germanium, 4666

Truesdell, C. Critical lengths for the propagation of sound in a viscous fluid, 1446. The maximum velocity in Gromeka–Beltrami motion, 4635

Trumpy, B. Time variations of cosmic ray intensity associated with geomagnetic and solar activity, 8503

Trumpy, B., Grotdal, T. and Graue, A. Angular distribution of the neutrons from the reaction ^{7}Li(*d*, *n*)^{8}Be, 1913

Trumpy, B. and Trefall, H. On the correlation between the cosmic ray intensity and the meteorological conditions, 8502

Trumpy, G. The JENER beta-spectrometer, 5516

Tryon, L. E. *See* Kulp, J. L., 1046

Tsaï, B. *See also* Bizette, H., 7794

Tsaï, B. and Wucher, J. Coupling between magnetic moments in molecules containing three iron atoms, 966

Tsai-Chü. *See also* Morand, M., 2527

Tsai-Chü and Morand, M. Spectral analysis of the (zenith) angle distribution and east-west asymmetry of the nucleonic component of cosmic rays, using nuclear emulsions, 7776

Tsien, H. S. The properties of pure liquids, 2999

Tsukada, K. *See* Kojima, S., 8621

Tsukkerman, I. I. "Non-optical" theory of focusing in axially symmetric magnetic fields, 6086

Tsuya, N. *See* Watanabe, H., 4206

Tsvetkov, V. N. and Klenin, S. I. Diffusion of polystyrene fractions in dichloroethane, 6531

Tsvetkov, V. N., Krozer, S. P. and Terent'eva, L. S. Dependence of diffusion rate on the concentration for some polymers in solution, 7499

Tsȳrlin, L. É. On the theory of the corona discharge under constant potential, 3326

Tsyunaĭtis, G. K. *See* Yutsis, A. P., 5660–1

Tucker, B. L. and Gregg, E. C. Threshold for γ-p in Be^{9}, 445

Tucker, D. *See* Wall, P. D., 4521

Tucker, D. G. Non-linearity in a voltmeter using cathode-follower and thermocouple, 3283

Tucker, G. *See* Hughes, V., 7846

Tucker, M. J. A wave-recorder for use in ships, 1277. A linear transducer for the electrical measurement of displacement, 2221. *See also* Darbyshire, J., 8177

Tucker, R. Pool surface and cathode spot temperature of mercury cathodes as a problem in heat conduction, 1660

Tunnicliffe, P. R. The differential and total neutron scattering cross sections of the deuterons in the energy range 0·1 to 1·0 MeV, 4364

Tunstead, J. Photoelectric absorption in lithium vapour, 4014

Tuominen, J. A Schmidt-camera for radio-waves, 4928

Tupper, J. L. Practical aspects of reciprocity-law failure, 4541

Turk, W. E. Photomultipliers: a survey of current types, 7683

Turkevich, A., Niday, J. B. and Tompkins, A. Radiochemical studies on the fission of Th^{232} with Li + D neutrons, 2728

Turkevich, A. and Tompkins, A. A search for Si^{32} in natural silicon, 4299

Turkevich, J. *See* Larach, S., 3161; Smith, A. W., 3156

Turnbull, A. H. and Harrison, M. F. A. The measurement of low concentrations of hydrogen in nitrogen, 7266

Turnbull, D. *See* Hoffman, R. E., 1960; Hollomon, J. H., 3714

Turnbull, D. T. Narrow pass band optical filters, 8326. *See also* Littlefield, T. A., 6608

Turner, C. *See* Daniel, V., 1616

Turner, E. B. *See* Hollyer, R. N., Jr, 3946

Turner, T. E. *See also* Hicks, B. L., 3997

Turner, T. E., Fiora, V. C., Kendrick, W. M. and Hicks, B. L. Preliminary analysis of the microwave spectrum of ethyleneimine, 4016

Turney, A. The dielectric properties of certain benzene derivatives in the solid state, 210, 7659

Turnock, R. C. *See* Meek, J. M., 2133

Tutihasi, S. *See* Tamura, M., 6799

Tuynman, C. A. F. *See* Van Itterbeek, A., 1184

Twaddell, W. F. Phonemes and allophones in speech analysis, 708

Twersky, V. On a multiple scattering theory of the finite grating and the Wood anomalies, 167 Remarks on the theory of grating anomalies, 781 Auxiliary mechanical sound sources for obstacle

perception by audition, 2282. Reflection coefficients for certain rough surfaces, 6153
s, R. Q. Propagation in electron-ion streams, 1772
mey, S. *See* McHenry, J. J., 3775*
blikov, S. V. On the theory of polarons, 1249. On the energy spectrum of an electron in a polar crystal, 5776
r, W. W. and Wilson, A. C., Jr. Thermal conductivity, electrical resistivity, and thermoelectric power of graphite, 2463
n, H. *See* Barkas, W. H., 1906
zer, F. G. *See* Callaway, D. B., 716
a, C. *See* de Laboulaye, H., 8689

lohde, A. R. *See also* Harpur, W. W., 1631; Kennedy, S. W., 8107; Thompson, F. W., 3635
lohde, A. R. and Woodward, I. Energy factors related to the configuration of flexible hydrocarbon molecules, 4956
nk, J. Theory of anti-ferromagnetic resonance in a crystal of rhombic symmetry at the absolute zero, 5937
all, H. The energy dependence of the phase shift in proton-proton scattering, 2499. The cross-section in proton-proton scattering for small energies, 4872. The nuclear photo-effect in beryllium at high energies, 5071. The photoeffect in a homogeneous electric field, 6791
H. *See* Freiwald, H., 7236
son, B. J. and Creedon, J. E. Comparison of electron density in different regions of a d.c. glow discharge, 253
chini, P. On an extended electromagnetic field, 2967
M. C., Shaw, H. L. and Boulger, F. W. Properties of beryllium, 8155
rsfeld, J. On the paramagnetic electronic resonance in certain ions, 6944. *See also* Blanc, D., 736
rsfeld, J. and Combrisson, J. Paramagnetic electron resonance. History and principal results, 5571
, A. *See* Ishiguro, M., 841
ing, E. A. *See* Young, J. A., Jr, 6133
, M. Field emission of crystal phosphors, 8334
n, R. J. and Misener, A. D. On the thermal properties of the Earth's interior, 557
g, H. H. Effect of local action currents on the .m.f. of the Weston Standard Cell, 5165
an, R. *See* Hermans, J. J., 2799
r, K. Electron-electron scattering in the energy region from 200 to 300 keV, 8446
skiĭ, M. M. *See* Golder, G. A., 6324–5; vitka, S. S., 2073; Melnikova, N. T., 2087
a, K. Note on the atom form factor calculated from the Thomas–Fermi model, 2622. The mean excitation energy of the Thomas–Fermi–Dirac atom, 623
a, K. and Nakano, Y. Solid solubility effect of metallic surface friction, 2773
a, K. and Tomishima, Y. TFD functions for non-zero temperatures and equations of state based on them, 5869
a, K. and Yamamoto, T. Note on the convergence of the Kroll method, 2401
awa, H. On the structure of the interactions of the elementary particles. II. Does the interaction of the second kind exist in the nature? 2953
awa, H. and Takahashi, Y., 8231
awa, M. *See* Kotani, T., 2741
tter, H. Viscosity as a material constant, 3899
hill, A. B. Note on the Stark broadening of γ, 4574. The hydrogen-helium ratio, 6437
wood, R. M. *See* Caffyn, J. E., 6691
W. On the radiation pressure in a planetary nebula. II, 3819; III. Problem of He ii, 3820
W. and Takakubo, K. On the internal motions planetary nebulae, 3821
n, R. S. *See* Hay, H. G., 2572
M. High resistance bridge for conductivity measurements, 7663
h, F. *See* Goddard, P. E., 2011
, P. Contribution to the W.K.B. method, 2588. e also Ledinegg, E., 2590, 4902

Urban, P. and Mitter, H. On the scattering of fast electrons, 3356
Uretz, R. B. *See* Simpson, J. A., 4191
Urey, H. C. The abundances of the elements, 10*. Comments on planetary convection as applied to the earth, 5223. On the concentration of certain elements at the earth's surface, 8121
Uri, N. Inorganic free radicals in solution, 1204
Ursell, F. Mass transport in gravity waves, 3911. The long-wave paradox in the theory of gravity waves, 8257
Usui, T. *See* Koide, S., 192
Utiyama, R. *See also* Dodo, T., 3871
Utiyama, R., Sunawaka, S. and Imamura, T. On the theory of the Green-functions in quantum electrodynamics, 2945
Utiyama, T. Statistics of two-dimensional Ising lattices of chequered types, 315
Uyeda, R. and Sugiura, Y. A flow-meter in vacuum technique, 2253
Uyeda, S. *See* Nagata, T., 963–4
Uyehara, O. A. *See* Millar, G. H., 6732

Vachaspati. The quantum mechanical equations of motion and the commutation relations, 8212
Vacher, M. and Lortie, Y. Spectroscopy of the emission of organic vapours excited by a high frequency field, 6598
Vaidya, P. C. Equations of fit for spherical distributions, 18. "Newtonian" time in general relativity, 2928. The boundary conditions in gravitational fields of spherical symmetry, 3849. Spherically symmetric solutions in nonsymmetrical field theories. I. The skew symmetric tensor, 4591
Vaĭnshteĭn, B. K. The crystal structure of $MnCl_2.2H_2O$, 2829. Electronographic determination of the structure of $NiCl_2.2H_2O$ and the crystal chemistry of compounds of this type, 6320
Vaĭnshteĭn, É. E. *See also* Barinskiĭ, R. L., 5504, 5507; Narbutt, K. I., 5505, 5508
Vaĭnshteĭn, É. E., Narbutt, K. I. and Barinskiĭ, R. L. The structure of the fundamental X-ray absorption edge of atoms in polar crystals and its connection with the ultraviolet absorption, 5506. Calculation of the structure of the main X-ray absorption edge of atoms in molecules, 6071
Vaĭnshteĭn, L. A. and Malyavkin, L. P. The rise of the variable component in photo-current of photo-cells at large intensities of illumination, 6054
Vaĭsman, I. A. Some rules in the composition of the nuclear spin and the nuclear shell model, 7030. The influence of nucleonic orbits on the effective cross-section for capture of slow neutrons, and the composition of the spin of odd-odd nuclei, 7148
Vajda, J. and Hart, D. P. A low temperature bath for constant temperature studies, 6005
Vakin, S. A. Propagation of electromagnetic waves along an infinite spiral crack, 5584
Valadares, M. *See* Rosenblum, S., 1026, 3520
Valdes, L. B. Measurement of minority carrier lifetime in germanium, 844
Valensi, J. and Clarion, C. Damped oscillations of a sphere in a viscous fluid, 1445
Valentin, F. and Sagot, M. A generator for 100 kV condensed discharges, 5487
Valentine, J. M. and Curran, S. C. Energy expenditure per ion pair for electrons and α-particles, 933
Valkenburg, A. Van. *See* Van Valkenburg, A.
Valkó, I. P. and Gergely, G. An improvement on the compensating method for measuring the rise and decay of luminescence, 2372
Valladas, G. and Bernas, R. A study of the fine structure of the α-radiation of ionium, 7878
Valladas, G. and Lévêque, A. Background noise in ionization chamber pulse amplifiers, 3382
Van Allen, R. *See* Robinson, G., 2922
VanArtsdalen, E. R. *See* Anderson, H. R., Jr, 8024; Dworkin, A. S., 6015
van Bueren, H. G. A model for demonstrating dislocations in crystals, 8059
Vand, V. *See* Qurashi, M. M., 8078
Vandekerkhove, E. On the variation of the colour index and gradient of extragalactic nebulae, 587

van den Berg, G. J. *See* Franken, B., 3318; Rietveld, A. O., 8273

Vanden Bosch, A. Radiation from ^{142}lanthanum, 7868

van den Burg, F. A. W. *See* Kramers, H. C., 6730

van den Dungen, F. H. On a variant integral associated with the wave equation, 2. Integral variants associated with linear hyperbolic equations, 1327. Rayleigh's principle and Newton's *regula falsi*, 3937. Formulae for the numerical integration of the wave equation. I, 4553; II, 4554

van den Dungen, F. H., Cox, J. F. and van Mieghem, J. The redistribution of air-masses above the oceans, 1285. Fluctuations in the earth's rotation and seismic activity, 5225. Effect of exchanges of transportable [material] between atmosphere and globe on the position of the instantaneous axis of rotation of the earth. On the fluctuations of sea-level, and of velocity of rotation of the earth, 7410

van den Handel, J. The paramagnetic susceptibility of a free radical, 2543

van den Handel, J., Gijsman, H. M. and Poulis, N. J. The magnetic susceptibilities of an anti-ferromagnetic single crystal of $CuCl_2.2H_2O$, 2538

van der Burgt, C. M. Dynamical physical parameters of the magnetostrictive excitation of extensional and torsional vibrations in ferrites, 7811. *See also* Wijn, H. P. J., 8536

van der Does de Bye, J. A. W. and Schenk, J. Heat transfer in laminary flow between parallel plates, 2404

Vanderhaege, G. *See* Baroni, G., 8485

van der Heide, H. *See* Wijn, H. P. J., 8571

Van der Held, E. F. M., Hardebol, J. and Kalshoven, J. On the measurement of the thermal conductivity of liquids by a non-stationary method, 6696

van der Maesen, F. *See* de Boer, J., 6549

Vander Sluis, K. L. *See* Rank, D. H., 100

van der Walt, N. The control and stabilization of the magnetic field for a mass spectrometer, 6867

van der Ziel, A. Shot noise in semiconductors, 4095. Noise in gas discharges, 4127. A simple method for measuring interface impedance, 5546. A simpler explanation for the observed shot effect in germanium filaments, 7750. *See also* Mattson, R. H., 4099

van de Vooren, A. I. Theory of the Erdmann interfermometer for investigation of compressible flows, 3180

van Dijck, G. Electrolytic polishing of mild steel. A study of surface roughness [rugosity], 1162

van Dijk, H. The extension of the International Temperature Scale below the oxygen point, 3264

van Dranen, J. Born repulsion and restricted free rotation, 1828. Some additional remarks on a hypothesis concerning the critical state, 4057. The total energy of substances at the critical point, 8364. The critical point and the disturbed rotation of molecules in the liquid state, 8365

van Dyke, M. D. Impulsive motion of an infinite plate in a viscous compressible fluid, 651

Vangen, V. *See* Isachsen, N., 5715

van Gerven, L. *See* van Itterbeek, A., 7685

van Heel, A. C. S. A precision refractometer without circular scale, 3970. Optical representation of images without use of lenses or mirrors, 6594

Van Heerden, I. J. *See* Gey van Pittius, E. van A., 7166

Van Horn, W. *See* Heck, P. H., 7490

Van Hove, L. Coulomb effects in pion scattering by protons under the charge independence hypothesis, 1935. The occurrence of singularities in the elastic frequency distribution of a crystal, 4473

Van Hove, L., Marshak, R. and Pais, A. Charge independence and multiple pion production, 1934

Van Iperen, B. B. *See* Milatz, J. M. W., 6442

van Itterbeek, A. *See also* Franken, B., 3318; Rietveld, A. O., 8273

van Itterbeek, A., de Greve, L., van Gerven, L. and Schepers, J. Measurements on superconductivity in thin tin films, 7685

van Itterbeek, A., De Greve, L., Van Veelen, G. F. and Tuynman, C. A. F. Thin glass layers as supports for electron microscopy, 1184

van Itterbeek, A., Forrez, G. and Mariens, P. Measurements on thermal diffusion with the use of ultrasonics, 8270

van Kampen, N. G. *S*-matrix and causality condition I. Maxwell field, 2960

van Leeuwen, C. J. *See* van Wijngaarden, J. G., 4174

Van Lieshout, R. *See* Nussbaum, R. H., 7882

van Mieghem, J. Equations of motion of the atmosphere integrated along the vertical, 5801. *See also* van den Dungen, F. H., 1285, 5225, 7410

Van Name, F. W., Jr. Concerning the frequencies resulting from distortion, 692

van Niekerk, J. N. and Schoening, F. R. L. X-ray evidence for metal-to-metal bonds in cupric and chromous acetate, 2086

van Niekerk, J. N., Schoening, F. R. L. and de Wet J. F. The structure of crystalline chromous acetate revealing paired chromium atoms, 8113

van Pittius, E. van A. Gey. *See* Gey van Pittius E. van A.

Van Regemorter, H. Determination of the surface temperature of the sun through a study of the intensity of vanadium lines, 6429*. *See also* Pecker J.-C., 4565

Van Rennes, A. B. Pulse-amplitude analysis in nuclear research. II, 928; III, 929; IV, 2505

van Roosbroeck, W. Large current amplifications in filamentary transistors, 2454*. The transport o added current carriers in a homogeneous semiconductor, 6778

van Rossum, L. Construction of an apparatus for the detailed investigation of nuclear tracks of al densities, 8166. *See also* Morand, M., 3414

Van Rysselberghe, P. Hydrogen overvoltage and atomic electrodes, 511. Stationary states with minimum entropy production in electrochemica systems, 5164. *See also* Zimmerman, H. K., Jr, 426

van Santen, J. H. *See* Haven, Y., 1633; Jonker, G. H. 6938

van Steenis, J. Determination of the velocity of burning 1583

Van Valkenburg, A. and Pike, R. G. Synthesis mica, 2804

Van Veelen, G. F. *See* van Itterbeek, A., 1184

Van Vleck, J. H. Models of exchange coupling in ferromagnetic media, 8524

van Vliet, K. M. *See* van Wijngaarden, J. G. 4173–4

van Weyenbergh, G. *See* Veckmans, J. L., 5825

van Wieringen, J. S. Anomalous behavior of the factor of LiFeCr spinels as a function of temperature 4909. Effect of mechanical treatment on th paramagnetic resonance of manganese in z sulphide powders, 6945. *See also* Milatz, J. M. W. 6375

van Wijngaarden, J. G. and de Haan, E. F. L frequency noise in electron tubes. C. Electron tubes 4175

van Wijngaarden, J. G. and van Vliet, K. M. L frequency noise in electron tubes. A. Space charg reduction of flicker effect, 4173

van Wijngaarden, J. G., van Vliet, K. M. and v Leeuwen, C. J. Low frequency noise in electro tubes. B. Measurements on triodes under norma operating conditions, 4174

Van Winckle, D. M. *See* Shulman, R. G., 4097

Van Winkle, Q. *See* Elson, R., 2726

van Zolingen, J. J. *See also* Milatz, J. M. W., 6441–

van Zolingen, J. J. and Went, J. J. Tri–α–naphth borine, a new scintillation material for therm neutrons, 4158

van Zoonen, D. and Prast, G., Jr. Properties o argon-bromine counters, 3372

Varnerin, L. J., Jr. Neutralization of ions and ioniza tion of atoms near metal surfaces, 7732

Varney, R. N. Drift velocities of ions in krypton an xenon, 292. Drift velocity of ions in oxyge nitrogen and carbon monoxide, 2514

Varshavskiĭ, L. A. On stability conditions of a linea system, 1444

Varshni, Y. P. Van der Waals' *a* and ionization pote tial of inert gases, 6899. Relation between critic temperature and pressure of normal paraffins, 836 *See also* Sodha, M. S., 4417

Vasil'ev, E. I. and Lopukhin, V. M. On the theory an electron tube with a helical travelling wave, 68

Vasil'eva, I. A. *See* Reĭkhrudel', É. M., 6065

Vassamillet, L. *See* Lambot, H., 2074, 2076 eur, J.-P. Diffraction of electromagnetic waves by n orifice in a conducting screen, 981. Diffraction f electromagnetic waves by openings in plane conducting sheets, 1773

y, A. *See also* Khaleq, A., 1280

y, A., Norinder, H. and Vassy, E. Spectroscopic tudy of long discharges in air, 6600

y, E. *See* Vassy, A., 6600

el, J. On a linear electron accelerator for 3–4 MeV, 832

ier, R. Magnetostriction of cobalt ferrites as a unction of composition, 341. Thermal variation of he magnetostriction of cobalt ferrite, 342

ov, V. S. An electron-optical method of investi- ating electromagnetic fields and its application to he study of the internal photoeffect, 6057

er, F. E. *See* Forsyth, P. A., 4231

mans, J. L. and van Weyenbergh, G. Attempted xplanation of "supraliminaire" audition and a nathematical analysis, 5825

er, W. *See* Couture-Mathieu, L., 129, 4710

n, G. F. Van. *See* Van Veelen, G. F.

endaal, A. L. *See* Wapstra, A. H., 8651

rd, L. Great intensity variations of Hα and effects n auroral spectrograms taken in rapid succession, 296. Enhancement of auroral hydrogen lines owards lower latitudes, 2102. Doppler displace- nent of auroral hydrogen lines and its bearing on ne theory of aurora and magnetic disturbances, 4518

er, V. I. On the occurrence of high energy heavy agments in the splitting of nuclei by cosmic rays, 055

os Hermida, S. Theory of the coercive field of nagnetic materials, 4218

ryès, G. Researches on short-lived β-radioactivity nd nuclear isomerism, 2662

lasen, P. S. Noise characteristics of pulse-jet ngines, 5358. Noise control for ground operation f the F-89 airplane, 5364

orst, H. *See* Glockler, G., 1427

ataraman, S. Refractivity of organic vapours, 26

teswarlu, P. On the infrared spectrum of methyl loroform, 752. *See also* Mizushima, M., 3996

R. K. Resonator absorbers in broadcast studios, 960

R. *See* Joel, N., 8080

skaya, G. N. *See* Bogoroditskiĭ, N. P., 6758

, M. Spin-orbit coupling and neutron polariza- on, 4391. *See also* Gamba, A., 4277

iolle, J. *See* Bonnemay, M., 6287, 6289

egen, L. Measurements of the velocity of sound some liquefied gases, 4664

ga, F. T. H. *See* de Vries, L. J., 3542, 4981

r, L. *See* Martin, A., 3368

, A. R. Observation on growth and etch pheno- ena on haematite (Fe_2O_3) crystals, 532. Transmis- on-like reflexion fringes in birefringent crystals, 91. *See also* Reynolds, P. M., 4469

, A. R. and Reynolds, P. M. Interferometric idies of the growth of stearic acid crystals and eir optical properties, 7283

ulen, R. Dimensional analysis, units and tionalization, 1601

r, P. Optical and photoelectric properties of crocrystalline layers of lead sulphide in the visible d infrared, 5393

n, E. V. *See* Goss, A. J., 2053

n, W. H. J., Calnan, E. A., Clews, C. J. B. and urse, T. J. The oxidation of iron around 200°c, 56

te, P. Concerning the precise determination of acceleration due to gravity: the complex role of viscosity of the gases, 1355. The determination the parameters of an experimental law by the ndition of least imprecision, 7378. The deter- nation of the parameters, or of a function of rameters, of an experimental law, by the condition least imprecision; simplification by weighting, 79

, S. N., Kulikov, A. M. and Charakhchy'an, N. Azimuthal asymmetry of cosmic rays in the atosphere at the equator, 7773

si, P. *See* Bassi, P., 7760

Verschaffelt, J. E. On the generalization of the thermal potential, 792. On the equivalence of the principle of superposition and Onsager's principle, 820. Thermomagnetic and galvanomagnetic effects [in metals], 836. On Onsager's relations, 4066. On the minima of energy dissipation, 4068. The electrodynamic potential, 4083. On the theory of the thermocouple, 4113. On electrokinetics, 4114. The thermomechanics of transport phenomena, 4642

Verster, N. F. *See* Nussbaum, R. H., 7071, 7865; Wapstra, A. H., 7867

Ververk, B. and Aten, A. H. W., Jr. Radiations from arsenic 70, 3550

Verzaux, P. The transmission of Hertzian waves through strongly ionized gases, 8591

Veshev, A. V., Semenov, A. S. and Novozhilova, M. E. A new aspect of the natural electric field in the earth, 5791

Vestine, E. H. On variations of the geomagnetic field, fluid motions, and the rate of the Earth's rotation, 2919

Vetter, K. J. Magnitude of the Flade potential of activation and passivification of iron and other properties of the passive layer, 8738

Victor, C. *See also* Bouissières, G., 7102

Victor, C., Teillac, J., Falk-Vairant, P. and Bouissières, G. A study of the γ-transitions of Ra (188 keV) and of RdTh(87 keV), 1897

Vidal, J. M. Tharrats. *See* Tharrats Vidal, J. M.

Vidale, M. L. Intensity of the soft and hard component of the cosmic radiation as a function of altitude at geomagnetic latitudes of 28°n, 41°n, and 55°n, 302

Vidro, L. I. and Stepanov, B. I. Intensity distribution in vibration spectra of linear chains, 5627

Vieira, G. Distribution figures of the active deposit on metallic plaques, 4977

Viénot, J. *See* Rénet, C., 4043

Viervoll, H. On the Fourier methods of interferometrical structure investigations, 2077

Vigean, F. Initial rise of the brightness of electroluminescent products under the action of an alternating field, 5414

Vigier, J.-P. On the relation between the wave with singularity and the statistical wave in unitary relativistic theories, 631. Forces acting on the usual lines of flow for particles of spin 0,½ and 1 in the pilot-wave theory, 1393. Wave mechanics in configuration space, 1395. Statistical density of particle ensembles in the casual interpretation, 4598

Vigneron, L. The use of photographic emulsions for the detection and study of nuclear phenomena. History, results and possibilities. Bibliography, 6366. General calculation of the range-energy relationship for particles in any emulsion or in a medium of any stopping power. Numerical application to the Ilford C2 emulsion, 6869

Vigneron, L., Chastel, R. and Génin, J. Study of radon absorbed in microcrystals of silver halides in nuclear research emulsions, 8165

Vigroux, E. *See also* Migeotte, M., 4568

Vigroux, E., Migeotte, M. and Neven, L. Equivalent widths of ozone bands at 9·6 μ, 4·75 μ, and 3·27 μ, 6617. High-dispersion study of O_3 absorption bands at 9 μ, 4·75 μ, 3·59 μ, and 3·27 μ, 6617

Viguier, G. The transition [to turbulent flow] in the flow of incompressible fluid along a plane, 4639

Vilbrandt, F. C. *See* Thompson, D., 5746

Vilenskiĭ, I. M. On the theory of the interaction of radio waves in the ionosphere, 983

Villard, O. G., Jr. *See also* Manning, L. A., 6390

Villard, O. G., Jr and Peterson, A. M. Scatter-sounding: a new technique in ionospheric research, 561

Villard, O. G., Jr, Peterson, A. M. and Manning, L. A. A method for studying sporadic-*E* clouds at a distance, 560

Villi, C. *See* Ferrari, F., 1860, 7831; Poiani, G., 7769, 7772

Vincent, D. H. *See* Houtermans, F. G., 4973; Meyer-Schützmeister, L., 4974

Vincent, E. *See* Cowan, G. R., 8731

Vincent-Geisse, J. Measurement of the intensity of the vibration-rotation rays of carbon monoxide, 5958. Measurements of intensity and width of absorption lines in the infrared. Variation with pressure, 7577

Vinogradov, A. P., Zadorozhnyĭ, I. K. and Zykov, S. I. Isotopic composition of lead and the age of the earth, 5798

Vinokurov, L. A. Thermal and infra-red extinction of a ZnS–Cu, Co phosphor, 7586

Vinti, J. P. Theory of the penetration of γ-rays through thin barriers, 7107

Violet, C. E. *See* Michaelis, R. P., 7370

Visconti, A. On a solution of equations of the diffusion type; applications to the theory of renormalization, 7439

Vishnevskiĭ, V. F. *See* Azimov, S. A., 5714

Viswanath, G. Absorption spectrum of *p*-chlorotoluene, 4020. Calculation of electronic energy levels of indene, 4256. Ultra-violet absorption spectra of halogenated toluenes, 4709

Vitale, B. The ionic equilibrium of the lower atmosphere and the theory of recombination, 7361. *See also* Belliboni, G., 7782; Merlin, M., 1714

Vleck, J. H. van. *See* Van Vleck, J. H.

Vliet, K. M. van. *See* van Vliet, K. M.

Vodar, B. *See* Astoin, N., 7555, 7582; Bergeon, R., 119; Coulon, R., 5386, 6622, 6637; Feldman, C., 218; Gilles, A., 140; Robin, J., 5432; Robin, S., 777; Romand, J., 7666

Vodden, H. A. *See* Baxter, S., 829

Vodop'yanov, K. A. Temperature-frequency dependence of the angle of dielectric loss in crystals with polar molecules, 5462

Voelz, F. L. Calculated thermodynamic properties of GeF_4, 197. *See also* Kneser, H. O., 5146; Meister, A. G., 1805; Pontarelli, D. A., 1804

Voetter, H. *See* v. Stein, M., 6001

Voevodskiĭ, V. V. and Kompaneets, A. S. Chain reaction with two diffusing active centres, 3682

Voge, J. Measurements, 6968. The troposphere and wave propagation, 6973

Vogel, C. B. Piezoelectric well hydrophones, 5930

Vogel, F. L., Pfann, W. G., Corey, H. E. and Thomas, E. E. Observations of dislocations in lineage boundaries in germanium, 5774

Vogel, T. Measurement of the absorption coefficients of sound, 4671

Vogelaere, R. de. *See* de Vogelaere, R.

Vogell, W. *See* Becker, E. W., 2628

Vogt, E. *See* Neamtan, S. M., 6454

Voigt, D. Determination of the magneto-optical constants of phosphite ions, 5597

Voisin, A. A continuously sensitive diffusion [cloud] chamber, 7746

Voisin, A. G. *See* Rose, D. C., 6921

Volans, P. *See* Bradley, R. S., 6709

Volchok, H. L. *See* Kulp, J. L., 6125

Volet, C. Measurement of the acceleration due to gravity at the Pavillon de Breteuil, 12

Volger, J. Anomalous specific heat of chromium oxide (Cr_2O_3) at the antiferromagnetic Curie temperature, 1593. *See also* Knol, K. S., 6803

Vol'kenshtein, A. A., Andreev, D. I. and Isaenko, V. I. Optical method for the measurement of luminous intensity, brightness and luminous flux, 5937

Vol'kenshteĭn, M. V. and Borovinskiĭ, L. A. Electronic spectra of aromatic compounds, 8617

Vol'kenshteĭn, M. V. and Byutner, É. K. Circular dichroism in crystals, 5429

Vol'kenshteĭn, M. V. and Ptitsyn, O. B. The rotational-isomerism theory of the melting of crystalline polymers, 5764

Vol'kenshteĭn, V. S. A rapid method of determining thermal characteristics of poor heat conductors, 795

Volkin, H. C. Effect of capture on the slowing-down length of neutrons in hydrogenous mixtures, 7964

Volkoff, G. M. Second order nuclear quadrupole effects in single crystals. I. Theoretical, 6947. *See also* Petch, H. E., 1845, 6948

Volkova, K. A. Ferromagnetic resonance with waves from a common radiator, 8553

Volman, D. H. and Brinton, R. K. Reactions of free radicals with aldehydes. The reactions of methyl and *t*-butoxy radicals with acetaldehyde and acrolein, 1202

Volop'yanov, K. A. and Vorozhtsov, B. I. On the question of the measurement of the dielectric loss angle and permittivity of solid dielectrics in the regions of ultra-short and decimeter waves, 5461

Volpi, G. G. *See* Boato, G., 4297

v. Békésy, G. Description of some mechanical properties of the organ of Corti, 6345. Shearing microphonics produced by vibrations near the inner and outer hair cells, 6346

v. Bertele, H. Current densities of free-moving cathode spots on mercury, 870. Pool surface and cathode spot temperature of mercury cathodes as a problem in heat conduction, 1660. Current densities of free-moving cathode spots on mercury, 6069

v. Borries, B., Lenz, F. and Opfer, G. Remanence in soft iron circuits of magnetic electron lenses, 4844

v. Buttlar, H. A new estimation of the half-value period of ThB (Pb^{212}), 6194. *See also* Begemann, F., 1047; Brix, P., 1499

v. Buttlar, H. and Wendt, I. Radioactive measurements in geology. I. Nuclear physical fundamentals, 5796; II. Measuring instruments. III. Practical applications, 5797

von Dardel, G. Combined Pirani and ionization gauge circuit, 4651

von Dardel, G., Hellstrand, E. and Taylor, C. Two systems for the synchronization of pulsed high-energy ion beams, 3363

v. Dardel, G. and Persson, R. Determination o neutron resonance parameters from measurements of the absorption integral: application to the mai resonance of uranium-238, 1949

von Eller, G. Contour lines and the optical representation of two-dimensional Fourier series, 8091

von Engel, A. *See* Francis, G., 6822; Harries, W. L. 4128

v. Erichsen, L. and Müller, R. Methods of working with the radioactive sulphur isotope ^{35}S, 1901

Von Foerster, H. *See* Babcock, M. L., 8475

v. Fragstein, C. and Schaefer, C. Beam displacemen on reflection, 7541

v. Friesen, S. and Leide, G. A release mechanism fo cosmic-ray-balloon experiments, 4893

von Gierke, H. E. Physical characteristics of aircra noise sources, 5357

von Günner, K. and Schulz, G. V. Heat of solutio and phase change in polystyrenes, 6304

v. Hámos, L. An X-ray microanalyzer camera, 5186

von Hippel, A. Piezoelectricity, ferroelectricity, an crystal structure, 209

von Hippel, A., Gross, E. P., Jelatis, J. G. and Geller M. Photocurrent, space-charge buildup, and fiel emission in alkali halide crystals, 8397

von Hoerner, S. Temporal evolution of a rotating mas of gas, 1351. Contribution to the turbulence theor of spiral nebulae, 5834

von Laue, M. The flow of particles in space-lattic diffraction of matter waves, 3754. Thermodynami and superconductivity, 6025

v. Mohrenstein, A. Numerical solution of th Schrödinger equation, 6484

Vonnegut, B. Thin films of supersaturated solutions f detecting, counting and identifying very sma crystalline particles, 657. Effect of halogens on t production of condensation nuclei by a heate platinum wire, 3776

Vonnegut, B. and Neubauer, R. L. Production monodisperse liquid particles by electrical atomiz tion, 5175

von Recklinghausen, D. *See* Scott, H. H., 5932

von Schelling, H. Simple graphic method for t additive mixture of two colours on the C chromaticity diagram, 8348

v. Stein, M. and Voetter, H. Determination of parti pressures from the total pressure of liquid mixture consequences of the Duhem–Margules equatio 6001

von Szalay, L. Application of the Picone procedure the [solution of the] differential equation of he conduction, 5433. On the heating of a cylinder finite length with given heat sources, 5434

Vooren, A. I. van de. *See* van de Vooren, A. I.

Voreck, R. C. *See* Pringsheim, P., 2062

Vorob'ev, A. A. The dependence of electrical streng on crystallographic direction, 5494

ob'ev, Yu. V. A method for the numerical integration of a class of equations of mathematical physics and its application to electron optical problems, 6084
ozhtsov, B. I. *See* Volop'yanov, K. A., 5461
P. J. G. De. *See* De Vos, P. J. G.
ava, E. Oriented overgrowth of platinum on muscovite, 7276
ava, E., Amelinckx, S. and Dekeyser, W. Spiral growth of thymol crystals from solution and melt, 4465
k, V. B. Stability of lyophobic sols, 1227
sden, P. The non-polarity of sodium niobate, 550
s, H. de. *See* de Vries, H.
s, L. J. de. *See* de Vries, L. J.
er, F. W. de. *See* de Vrijer, F. W.
ljan, V. S. On the Darwin method for the calculation of the magnetic moment of the electron and of the positron, 4781
elant, C. On the importance of the most probable electron configuration in the study of electronic systems, 6990. The most probable electron configurations in atoms and molecules, 6991. Calculation of integrals arising for certain approximate forms of the wave function, 7467. *See also* Chalvet, O., 7018*; Daudel, R., 3700
men, B. *See* Dostrovsky, I., 523, 3707–8
cino, S. Preparation and study of some thin films of high polymers used in nuclear physics, 1967
anović, V. and Pavlović, B. Determination of low concentrations of heavy water, 4630
s, M. F. and Bilenko, I. I. An experimental investigation of the dependence of the intensity of the polarized components of Rayleigh scattering of liquids on temperature, 3188
'fson, K. S. and Libin, I. Sh. Slit source in spectrophotometric measurements, 5991
tskin, A. Ya. Non-elastic resonance scattering of electrons in metals, 5518

ard, H. de. *See* de Waard, H.
da, A. *See* Morino, Y., 1811
da, M. *See* Kameda, T., 4188
da, W. W. Scattering of charge symmetric pseudoscalar mesons by nucleons, 629
da, Y. and Shimbo, S. The absorption of ultrasonic waves in benzene solutions of methyl metacrylate in different polymerization stages, 5343
de, F. *See* Jaques, T. A. J., 1159, 4398; Sharpe, J., 3377
dey, W. G. *See* Strickler, T. D., 2673
le, A. de. *See* de Waele, A.
fler, H. *See* Nabholz, H., 5704
gener, S. Sorption of gases at very low pressures by thorium powder, 7506
gman, D. D. *See* Evans, W. H., 3276
gner, C. Theoretical analysis of the diffusion processes determining the oxidation rate of alloys, 481. The electrochemistry of ionic crystals, 8063
gner, F., Jr. *See also* Freedman, M. S., 1068, 1881
gner, F., Jr, Freedman, M. S., Engelkemeir, D. W. and Huizenga, J. R. Radiations of 6·7-day U^{237}, 2656
gner, P. and Duncan, A. B. F. The absorption spectrum of cyclopropane in the vacuum ultraviolet. Note on the absorption spectrum of methyl cyclopropane, 3147
il, A. C. Production of Fe^{59} by the Co^{59} (n, p) reaction in the Brookhaven reactor, 3603. *See also* Kahn, M., 7232
il, R. Decades with four double-triodes, 5541
ilin, H. B. and Naumann, V. O. The transmission of hydrogen through palladium by electrolysis, 2752
ir, J. C., McCormick, W. W. and Sawyer, R. A. Emission characteristics of vacuum spark discharges, 3096
delich, D. L. The rectifying property of polarized barium titanate, 7653
gh, D. T. *See* Henderson, S. T., 5430
n, H. L. Some observations on the yield point in zinc, 1989
nwright, C. *See* Coyle, R. A., 5207
t, J. R. Reflection of electromagnetic waves obliquely from an inhomogeneous medium, 1777. A transient magnetic dipole source in a dissipative medium, 3446. The potential of two current point sources in a homogeneous conducting prolate spheroid, 4782. A conducting permeable sphere in the presence of a coil carrying an oscillating current, 4922. The radiation fields of a horizontal dipole in a semi-infinite dissipative medium, 6971. Transient coupling in grounded circuits, 7343. Electromagnetic fields of current-carrying wires in a conducting medium, 7344. Mutual inductance of circuits on a two layer earth, 7345
Wait, J. R. and Campbell, L. L. Effect of a large dielectric constant on ground-wave propagation, 4232
Wajda, E. S. *See* Shirn, G. A., 925
Wakatsuki, T. On the "capture scattering" of fast neutrons, 1948
Wakelin, R. J. and Yates, E. L. A study of the order-disorder transformation in iron-nickel alloys in the region FeNi$_3$, 3719
Wakely, P. G. A binding energy calculation on He^4 with single-particle wave functions, 6170
Wakiya, S. A spherical obstacle in the flow of a viscous fluid through a tube, 3906
Walcher, W. *See* Bähnisch, I., 1058
Walchli, H. E. Nuclear magnetic resonance measurements of selenium, 5657
Waldmann, L. On the electron g-factor according to classical field mechanics, 1367. Quantum mechanics of rigid electrons and the Lamb shift, 8240. *See also* Mattauch, J., 6864
Waldmeier, M. Synthesis of the solar corona, 2912. The limb-darkening of the Sun at the radio-frequency of $\lambda 10{\cdot}7$ cm, 6423
Waldron, R. D. The infrared spectra of three solid phases of methyl ammonium chloride, 4006
Walen, R. On the continuous, cascade-type enrichment in isotopes, 4972. On the mean values used in the slowing down of neutrons, 5118
Walker, D. *See also* Chackett, K. F., 8673; Link, W. T., 8338
Walker, D. and Fremlin, J. H. Acceleration of heavy ions to high energies, 3361
Walker, D., Link, W. T. and Smith, W. I. B. A search for the nuclear reaction ^{4}He (α, n) ^{7}Be, 1104
Walker, J. *See* Cooper, P. N., 8459–60
Walker, J. G. *See* Bozorth, R. M., 1795, 2579
Walker, P. M. B. A recording microdensitometer applicable to biological problems, 5371
Walker, R. L., Oakley, D. C. and Tollestrup, A. V. Photoproduction of neutral mesons in hydrogen at high energies, 5102
Walker, R. M. *See* Sonnenschein, R. R., 8823
Walker, W. D. Interactions of μ-mesons, 4388. *See also* Greisen, K., 6121; Kaplon, M. F., 6127
Walker, W. D. and Duller, N. M. Unstable particles from penetrating showers, 4896
Walker, W. G. and Baker, S. C. A symmetrical cathode follower bridge circuit for direct spectrochemical analysis, 8757
Walker, W. H. and Thode, H. G. Relative abundances and neutron capture cross sections of the neodymium isotopes, 4971
Wall, F. T., Grieger, P. F. and Childers, C. W. A rapid method for measuring diffusion coefficients for solutions, 3006
Wall, L. A. and Magat, M. Degradation of polymers by gamma rays and neutrons, 8025
Wall, M. C. *See* Laidler, K. J., 7235
Wall, N. S. *See* Gove, H. E., 2690
Wall, P. D., Tucker, D., Fry, F. J. and Mosberg, W. H., Jr. The use of high intensity ultrasound in experimental neurology, 4521
Wallace, A. A. *See* Calderwood, J. H., 1620, 6759
Wallace, P. R. *See* Williams, R. C., 8049
Wallace, W. E. *See* Smith, C. S., 7210
Wallenstein, M. *See* Eyring, H., 5306
Waller, I. *See* Svenonius, P., 1392
Wallin, W. A note on apparent magnification in out-of-focus images, 2311
Walling, J. C. *See* Hoare, F. E., 4064
Wallmark, J. T. Influence of initial velocities on electron transit time in diodes, 290. Space charge spread of reflected electron beams studied by a photographic method, 5512

Wallwork, S. C. and Harding, T. T. Molecular compounds of the quinhydrone type, 1823

Walsh, A. Reduction of scattered light in a Littrow-type monochromator, 2324. Design of double-beam multiple monochromators, 3979

Walsh, A. D. The near ultraviolet spectrum of formaldehyde, 152. Electronic orbitals, shapes and spectra of polyatomic molecules, 1816. *See also* Chamberlain, G. H. N., 2004; Hoare, D. E., 1208, 2800; Sutcliffe, L. H., 3146

Walsh, J. M., Shreffler, R. G. and Willig, F. J. Limiting conditions for jet formation in high velocity collisions, 2994

Walsh, J. W. T. The establishment of the photometric scale at the National Physical Laboratory, 3080. Photometry, 4682

Walske, M. C. The stopping power of *K*-electrons, 1850

Walt, M. *See also* Adair, R. K., 4392

Walt, M. and Barschall, H. H. Angular distributions of elastically scattered 1-MeV [±100 keV] neutrons, 6240

Walt, M., Becker, R. L., Okazaki, A. and Fields, R. E. Total fast neutron cross sections of Co, Ga, Se, Cd, Te, Pt, Au, Hg and Th, 4366

Walt, N. van der. *See* van der Walt, N.

Walters, M. C. The origins of background tracks in shielded electron-sensitive emulsions, 2878. *See also* Fremlin, J. H., 1882

Waltner, A. *See* Baker, P., Jr, 1911

Walton, G. N. The efficiency of an immersion counter for measuring beta and gamma emitters in solution, 4154

Walz, F. C. *See* Pietenpol, W. B., 4567

Wanders, G. *See* Stueckelberg, E. C. G., 8208

Wangsness, R. K. Exchange coupling and the Curie–Weiss law, 314. On the anomaly in the heat capacity of manganous oxide, 1592. Antiferromagnetic resonance above the Curie temperature, 1748. Geometrical solution for a nuclear moment in a magnetic field, 4284

Wangsness, R. K. and Bloch, F. The dynamical theory of nuclear induction, 2619

Waniek, R. W. *See also* Thorn, R. N., 6195

Waniek, R. W. and Ohtsuka, T. Nuclear stars in emulsions, 3579. Angular distribution of particles from stars, 5087

Wänke, H. An electronic-optical process for the recording of the amplitude distribution of electrical impulses, 4881

Wanlass, S. D. *See* Leighton, R. B., 1943

Wanless, R. K. and Thode, H. G. The mass spectrometer determination of the half-life of Kr^{85}, 4984

Wannier, G. H. Motion in gaseous ions in strong electric fields, 4178. The threshold law for single ionization of atoms or ions by electrons, 6117. *See also* Lewis, H. W., 952*

Wansdronk, C. *See* Clay, J., 2523

Wapstra, A. H. The 2$^+$ first excited state in heavy even-even nuclei, 4273. The decay scheme of RaC, 4987. The decay scheme of RaC, 6196. *See also* Lindström, G., 3564; Milatz, J. M. W., 6375, 6443; Nussbaum, R. H., 7071, 7865; Sterk, M. J., 7866

Wapstra, A. H., Sterk, M. and Kropveld, R. E. W. Some remarks about the decay of ^{237}U, 3551

Wapstra, A. H. and Veenendaal, A. L. The decay of Mg^{28}, 8651

Wapstra, A. H., Verster, N. F. and Boelhouwer, M. Some radioactive isotopes of I, Xe, and Cs, 7867

Warburton, J. A. *See* Christiansen, W. N., 6422

Ward, A. H. A.C. operation of ion chambers, 7741

Ward, F. L. Helmholtz resonators as acoustic treatment at the new Swansea studios, 7536

Ward, J. C. *See* Kac, M., 2811

Ward, S. G. *See* Oliver, D. R., 3693

Warekois, E. P. *See* Warren, B. E., 7215

Warhurst, E. *See* Gowenlock, B. G., 7262–3

Waring, W. Some thermodynamic properties of formic acid, 199

Warminsky, R. *See* Broser, I., 1546

Warner, R. M., Jr. *See* Rosenblum, E. S., 1091

Warren, B. *See* Knight, J. D., 7874

Warren, B. E. *See also* Keating, D. T., 540; McKeenan, M., 2770

Warren, B. E. and Averbach, B. L. The separation of stacking fault broadening in cold worked metals, 486

Warren, B. E. and Warekois, E. P. Measurements of stacking faults in cold worked alpha-brass, 7215

Warren, D. R. *See* Egerton, A. C., 501

Warren, J. B. *See* Griffiths, G. M., 3568

Warren, J. W., Marriott, J. and Craggs, J. D. Negative-ion formation in gases of high dielectric strength, 4176

Warren, R. L. and Charlwood, P. A. Photoelectric control of the compensator in electrophoresis, 3323

Warren, S. R., Jr. *See* Ritter, V. W., 573

Warshaw, S. D. *See* Marshall, J., 1147

Warters, W. D., Fowler, W. A. and Lauritsen, C. C. The elastic scattering of protons by lithium, 7919

Waser, J., Levy, H. A. and Peterson, S. W. The structure of PdO, 8101

Washburn, H. W., Berry, C. E. and Hall, L. G. Measurement of deuterium oxide concentration in water samples by the mass spectrometer, 5189

Wasiutynska, Z. L. *See* Lechno-Wasiutynska, Z.

Wassenaar, T. *See* Michels, A., 6537, 6708, 6712

Wasserrab, T. The [voltage] gradient in mercury vapour positive columns, 4823

Wataghin, G. *See* Bertolini, G., 1730

Watanabe, H. *See also* Hirone, T., 1763

Watanabe, H., Tsuya, N. and Takahashi, T. Magnetization and microwave resonance absorption of the solid solutions of magnetic ferrites and cadmium ferrite, 4206

Watanabe, J. *See* Yamamoto, M., 4462–4

Watanabe, K. Improvement of grating efficiency in the vacuum ultraviolet by platinizing, 4695. *See also* Hinteregger, H. E., 6796

Watanabe, K. and Inn, E. C. Y. Intensity measurements in the vacuum ultraviolet, 1497

Watanabe, K., Inn, E. C. Y. and Zelikoff, M. Absorption coefficients of gases in the vacuum ultraviolet, 1535. Absorption coefficients of oxygen in the vacuum ultraviolet, 5963

Watanabe, K., Marmo, F. and Inn, E. C. Y. Formation of the *D*-layer, 5236

Watanabe, M. *See* Muto, T., 8771

Watanabe, S. Connection between fusion theory of bosons and nonlocal field theory, 8230

Watanabé, T. *See also* Atoji, M., 8069

Watanabe, T. and Tanaka, T. The dielectric polarization of polar liquids, 827

Watanabe, Y. *See* Ito, D., 53; Nimura, T., 2280

Watari, T. *See* Kurata, M., 2965

Watase, T. *See* Kakudo, M., 2834

Watase, Y. *See* Kusumoto, O., 6124

Watelle, G. *See* Amiot, R., 8032

Waterman, H. *See* Johns, M. W., 2491

Watkins, G. D. and Pound, R. V. Intensities of nuclear magnetic resonances in cubic crystals, 2549

Watson, G. S. *See* Gilet, P. M., 5830

Watson, H. A. and Buechner, W. W. Magnetic analysis of the $F^{19}(d, p)F^{20}$ and $F^{19}(d, \alpha)O^{17}$ reactions, 1914

Watson, K. M. The effect of final state interactions on reaction cross sections, 624. Multiple scattering and the many-body problem—applications to photomeson production in complex nuclei, 2714. *See also* Brueckner, K. A., 4616; Francis, N. C., 2711

Watson, R. B. *See* Botsford, J. H., 697

Watson, W. H. *See* Atkins, K. R., 6007

Watson, W. W. Methods of increasing the efficiency of thermal diffusion columns, 72. *See also* Anderson, C. E., 391, 5001

Watt, D. A. A.C. liquid metal pumps for laboratory use, 8042

Watt, I. C. *See* Mulcahy, M. F. R., 3684–5

Waugh, D. F. and Yphantis, D. A. Rotor temperature measurement and control in the ultracentrifuge, 811

Wax, N. Space charge requirements in some ideally focused electron-optical systems, 6839

Way, K. Medium-energy nuclear physics, 1024

Waymouth, J. F. Optical measurements on electroluminescent zinc sulfide, 3158

Waynick, A. H. *See* Gibbons, J. J., 4234

Weatherly, T. L., Davidson, E. H. and Williams, Q. The pure quadrupole spectrum of hexachlorobenzene, 4951

Weaver, A. B. A search for penetrating showers from hydrogen at sea level using a cloud chamber, 4186

ER, H. E., Jr. Magnetic moments of Si^{29}, S^{33}, Zn^{67}, As^{75}, Se^{77}, Te^{123}, and Te^{125}, 3525

, E. L. *See* Cole, D. P., 924

, F. J. and Wilks, J. The thermal conductivity of olid helium at high densities, 7632

, L. A. *See* Graves, J. D., 2370

ER, A. C. *See* Billmeyer, F. W., Jr, 2395

ER, R. T. and Spohr, D. A. Thermal resistivity of uperconducting mercury in the intermediate state, 426

R, A. *See also* Ferigle, S. M., 196, 2594, 4250

R, A. and Ferigle, S. M. Thermodynamic roperties of chlorine trifluoride, 203

R, A., Meister, A. G. and Cleveland, F. F. ubstituted methanes. XIV. Vibrational spectra, otential constants, and calculated thermodynamic roperties of bromochloromethane, 5635

R, A. H. *See* Buder, E. E., 7680

R, A. P. Studies on oxide cathodes with resistive terface, 4891

R, D. *See also* Holm, R. J., 722; Penner, S. S., 999

R, D., Holm, R. J. and Penner, S. S. Integrated osorption for vibration-rotation bands of CO$_2$, 762

R, E. Conformal mapping applied to electro- agnetic field problems, 2891

R, J. Quantum theory of a damped electrical scillator and noise, 6460

R, M. Theory of the combination seismograph, 339

R, S. *See* Kluge, W., 7678

ER, E. W. *See* Moos, W. S., 4537

A, H. W. *See* Kretschmar, G. G., 5884

TMAN, J. and Koehler, J. S. Internal friction and oung's modulus of cold-worked copper single ystals, 7216

NER, H. A critical comment on the paper by . Bucka and U. v. Haselberg, on "Demonstration f the measurement of thermal molecular velocities ith an analytical balance," 6529

NER, K. Solar radiation and its measurement, 6421

ANN, L. Object changes in the electron microscope relation to beam intensity, 5130

ER, U. *See* Hausser, K. H., 1220

L, R. A. Optical characteristics of a 980 : 222 ass, 5940

IANN, J. J., Kuhn, H. and Kuhn, W. Some mensions of long chain linear molecules, 7828

ER, H. *See* Lindberg, A., 872

L, R. G. and Ries, H. Measurement of flux and ficiency of fittings of considerable length, 6586

H. A simple method for the preparation of Al ngle crystals of given orientation, 7277

A. Raman spectrum of the water of crystallization HgCl$_4$K$_2$.H$_2$O, 7597

L. The texture of fine ferromagnetic powders, 72

A. R. Growth patterns on synthetic cadmium lphide, 5769

G. *See* Simon, J.-C., 2568

J. Apparatus for the measurement of reactivity a nuclear reactor, 5712

J. and Brière, M. An arrangement for measuring e level of heavy water in the Sacley reactor. eneralization for measuring liquid levels and metal icknesses, 5713

N, A. L. *See* Coffin, F. D., 3669

ERG, A. M. Current status of nuclear reactor eory, 459. Recent advances in reactor technology, 43

ERG, E. H. The creep of zinc single crystals ect shear, 1195, 6276

ERG, F. and Chalmers, B. Further observations dendritic growth in metals, 7274

ERG, I. G. and Blatt, J. M. The uniform model the nucleus, 2612

ERG, L. Synthesis of unbalanced RLC networks, 43

RGER, M. A., Habgood, H. W. and Schneider, G. On the liquid-vapor coexistence curve of xenon the region of the critical temperature. II, 3244

RGER, M. A. and Schneider, W. G. Density tributions in a vertical tube containing xenon ar the critical temperature as measured by a lioactive tracer technique, 3245

Weinman, J. *See* Franklin, A. D., 7974

Weinreich, G. *See also* Hughes, V., 7846, 8642

Weinreich, G., Grosof, G. M. and Hughes, V. W. Hyperfine structure of the metastable triplet state helium-3, 8641

Weinreich, O. A. and Danforth, W. E. Optical properties of crystalline thoria, 763

Weinstein, B. K. *See* Vaĭnshteĭn, B. K.

Weinstein, E. E. *See* Vaĭnshteĭn, É. E.

Weinstein, L. A. *See* Vaĭnshteĭn, L. A.

Weinstein, M. S. Some design considerations for high frequency anechoic tanks, 2295

Weinstein, W. The oblique transmission factor of multi-layer thin films, 5978

Weinstock, B. *See also* Abraham, B. M., 3252

Weinstock, B., Abraham, B. M. and Osborne, D. W. Nuclear alignment and the entropy of liquid He^3, 2415

Weinstock, B. and Pellam, J. R. Thermal Rayleigh disk measurements in He^3-He^4 mixtures, 3261

Weinstock, E. V. *See* Halpern, J., 7932

Weintraub, S. *See* Smith, E. K., Jr, 8593

Weise, E. K. and Lesk, I. A. On the electrical conductivity of some alkaline earth titanates, 6771

Weiss, J. *See* Milling, B., 1221; Rigg, T., 3687; Taylor, W., 8730

Weiss, M. T. and Fox, A. G. Magnetic double refraction at microwave frequencies, 339

Weiss, P. R. *See* Anderson, P. W., 8514

Weiss, R. J., Clark, J. R., Corliss, L. and Hastings, J. Neutron diffraction studies of cold worked brass, 1269

Weisskopf, V. F. Nuclear structure and nuclear forces, 1837. Shell model and nuclear structure, 5648. *See also* Blatt, J. M., 4335; Feshbach, H., 5081

Weissler, A. Sonochemistry: the production of chemical changes with sound waves, 5923

Weissler, G. L. *See also* Po Lee, 6359

Weissler, G. L. and Wilson, T. N. Work functions of gas-coated tungsten and silver surfaces, 4179

Weissman, I. A. *See* Vaĭsman, I. A.

Weissman, S. I. *See* Townsend, J., 2548

Weizel, W. Derivation of quantum theory from a classical, causally determined model, 5849. Derivation of quantum theory from a classical model. II, 8210

Welch, A. J. E. A three-dimensional coordinate model for demonstration of inorganic crystal structures, 8081

Welch, D. F. *See* Campbell, J. S., 2507

Welker, H. On new semiconducting compounds 3298; II, 6773. *See also* Madelung, O., 6039

Welkowitz, W. Crystal acoustic arrays, 3953

Weller, F. *See* Schachenmeier, R., 6031

Wells, R. J. and Crocker, B. E. Sound radiation patterns of gas turbine exhaust stacks, 5366

Welsh, H. L. *See also* Chisholm, D. A., 754; Cumming, C., 6664

Welsh, H. L., Crawford, M. F., Thomas, T. R. and Love, G. R. Raman spectroscopy of low pressure gases and vapors, 6660

Welsh, H. L. and Sandiford, P. J. The absolute intensity of the ν_4 infrared absorption band of methane and its enhancement by nitrogen at high pressures, 135

Weltmann, R. N. *See also* Shaw, D., 16

Weltmann, R. N. and Kuhns, P. W. Effect of shear temperature on viscosity in a rotational viscometer measurement, 2791

Welton, T. A. *See* Simon, A., 3580, 5864

Wendt, G. *See* Dufour, C., 8450

Wendt, I. *See* v. Buttlar, H., 5796–7

Weniger, C. and Herman, L. Effect of an electric field on the profile of the H I $(2^2P_0\text{-}n^2D)$ lines emitted in radiative transitions, 1495

Wennerblom, A., Zimen, K. E. and Ehn, F. Silicon-31: separation from irradiated phosphorus half life and β-energy, 1052

Went, J. J. *See* van Zolingen, J. J., 4158

Wentzel, G. Three-nucleon interactions in Yukawa theory, 2205. Remarks on scalar pair theory, 6458

Wenzel, A. On the existence of a hidden transition in biphenyl, 3116. The atmospheric light and its influence on colours in the landscape, 8350

Wenzel, W. A. and Whaling, W. Cross section and angular distribution of the D(d, p)T reaction, 1124
Werle, J. New approach to the problem of higher order corrections in the meson theory of nuclear forces, 2202
Werner, F. D. and Leadon, B. M. Very accurate measurement of fringe shifts in an optical interferometer study of gas flow, 3179
Werner, G. K. Semi-automatic recording of wavelength data, 7413
Werner, J. *See* Chang, C.-C., 3
Wernholm, O. A 35-million volt synchrotron, 888
Werz, R. *See* Riezler, W., 6115
Wesemeyer, H. and Raether, H. Cleaning of electrolytically polished metallic surfaces by means of cathodic spraying, 1217
Wesler, J. E. *See* Peistrup, C. F., 3070
Wessel, G. *See* Hin Lew, 4286
Wessel, W. The theory of the electron. III, 1368
Wessel, W. and Czyzak, S. J. On the interpretation and generalization of Dirac's theory of the electron, 7648
Wesselink, A. J. *See* Thackeray, A. D., 5282
West, D. *See* Chanson, P., 2530; Price, B. T., 3407
West, D. C. The photoelectric constants of iodine, 6797
West, G. W. *See* Clarebrough, L. M., 2767, 8722
West, R. Low-energy gamma-ray sources, 4319
West, W. J. Size determinations of clay particles in water suspensions by use of low-angle X-ray diffraction, 2793
Westcott, C. H., Greenberg, J. S. and Kirkaldy, J. S. An experimental study of counting losses due to dead-time effects, 6893
Westermann, H. and Pfefferkorn, G. Extended interference streaks on electron microscope pictures of organic substances, 5131. Image defects in the electron microscope, 6087
Westermark, T. Production of P^{33} with thermal neutrons, 1132
Westervelt, P. J. The theory of steady rotational flow generated by a sound field, 2266*
Westfall, F. O. *See* Corliss, C. H., 4753
Westfold, K. C. Collisional effects and the conduction current in an ionized gas, 8478
Westhead, J. M. *See* Bishop, G. R., 6214
Westley, R. *See* Lilley, G. M., 7510
Weston, R. E., Jr. *See also* Sirvetz, M. H., 5645
Weston, R. E., Jr and Sirvetz, M. H. Vibrational frequencies of phosphine-*d* and phosphine-d_2, 1004
Westpfahl, K. *See* Müller, R., 6154
Westrip, G. M. *See* Pring, J. N., 1233
Westrum, E. F., Jr, Hatcher, J. B. and Osborne, D. W. The entropy and low temperature heat capacity of neptunium dioxide, 3273
Wet, J. F. de. *See* de Wet, J. F.
Wexler, R. Theory of the radar upper band, 4502. Precipitation growth in stratiform clouds, 4503
Wexler, S. *See also* Hamermesh, B., 5083; Harris, S. P., 7186*
Wexler, S. and Davies, T. H. The dissociation of ethyl bromide and iodide by neutron capture, 1223. The average electric charge of daughter atoms from β-decay and isomeric transition, 1891
Wey, R. *See* Foex, M., 6951
Weyde, E. On a practical application of the Clayden effect, 6357
Weyenbergh, G. van. *See* van Weyenbergh, G.
Weyl, P. K. The energy loss of hydrogen, helium, nitrogen, and neon ions in gases, 6868
Whalen, J. A. *See* Jastram, P. S., 922
Whalin, E. A. and Hanson, A. O. Observation of the (γ, $2n$) reaction in Ta, 2707
Whaling, W. *See* Mileikowsky, C., 1912; Wenzel, W. A., 1124
Wheatley, J. and Halliday, D. The quenching of *ortho*-positronium decay by a magnetic field, 1096
Wheeler, B. W., Jr. *See* Leistner, K., 1566
Wheeler, C. M., Jr. *See* Haendler, H. M., 4023
Wheeler, D. J. *See* Wilkes, M. V., 2139
Wheeler, G. W. *See* Anderson, C. E., 391, 5001
Wheeler, J. A. *See* Hill, D. L., 3522
Whiffin, A. C. *See* Smith, E. E., 1099
Whipple, F. L. On the icy conglomerate model for comets, 6402
White, A. D. *See* Lampert, M. A., 8432
White, D., Chien Chou and Johnston, H. L. Heat conduction and isotherms of adsorbed helium on silica gel, 805
White, D., Gonzales, O. D. and Johnston, H. L. Heat conduction on the boundary layer in liquid helium II, 2413
White, D., Hu, J.-H. and Johnston, H. L. The inte molecular force constants of fluorine, 6983
White, G. K. The thermal conductivity of gold at low temperatures, 6700
White, G. R. *See* Fry, W. F., 4381
White, H. F., Cowan, G. R., Rotenberg, D. an Crawford, B., Jr. Note on the infrared absorptio of the flame of a simple double base powder, 7579
White, R. S. *See also* Jakobson, M. J., 7955; Jarmie N., 8701
White, R. S., Jacobson, M. J. and Shulz, A. G. The production of charged photomesons from deuterium and hydrogen. I, 1148
White, W. C. and Rinehart, J. S. Spectra of materia ejected from plaster by the impact of ultraspee pellets, 116
Whitehead, M. N. *See* Cartwright, W. F., 7954
Whitehead, W. D. *See* Snowdon, S. C., 5084
Whitehill, H. J., Jr. Portable seismograph, 2092
Whitehouse, W. J. *See also* Barclay, F. R., 7082 Galbraith, W., 4341; Jelley, J. V., 6916
Whitehouse, W. J. and Putman, J. L. Radioactiv isotopes; an introduction to their preparation measurement and use, 5051
Whitehurst, H. B. *See* Milligan, W. O., 948
Whitehurst, R. N. *See* Motz, H., 6852
Whiteley, T. B. and Alldredge, L. R. A photo mechanical wave analyser for Fourier analysis transient waveforms, 84
Whitesell, W. J. *See* Johnson, V. A., 3303
Whitham, G. B. The flow pattern of a superson projectile, 661
Whiting, F. B. *See* Aldrich, L. T., 2630
Whitman, C. I. Comment on "The accuracy of th Knudsen effusion method for measuring vapor pressures," 8361
Whitmore, G. F. *See* Johns, H. E., 7112
Whittaker, D. *See* Fox, L. L., 8380
Whittaker, E. J. W. The polarization factor fo inclined-beam photographs using crystal-reflecte radiation, 3733. The Cox and Shaw factor, 3742
Whittemore, W. L. *See also* Fowler, E. C., 717 Fowler, W. B., 7171, 8688
Whittemore, W. L. and Shutt, R. P. Coulomb an nuclear interactions of cosmic-ray mesons and pro tons in lead, 1736
Whittle, C. E. *See also* Jastram, P. S., 413
Whittle, C. E. and Porter, F. T. The gamma-ra cascade following decay of Sc^{46}, 4998
Whittle, E. and Steacie, E. W. R. The reactions methyl radicals with the hydrogen isotopes, 6280
Whyte, G. N. On the γ-ray spectrum of Ra(B + C 7098. *See also* Dixon, W. R., 7097; Ghosh, A 8667; Kastner, J., 7066
Whyte, L. L. Dimensional theory: dimensionles secondary quantities, 4580
Wiblin, E. R. *See* Goulding, F. S., 7192; Morrison A. W., 1919
Wichert, G. *See* Mönch, G. C., 8301
Wick, G. C., Wghtman, A. S. and Wigner, E. P. Th intrinsic parity of elementary particles, 24
Wick, R.F. *See* Mason, W. P., 3470
Wicke, E. and Eigen, M. Space requirements an coefficients of activity of strong electrolytes aqueous solution, 4641. Coefficient of activity strong electrolytes as function of concentration, 62
Wicke, E. and Fritz, H. The dissociation energy fluorine by the explosion method, 6159
Widgoff, M. The multiplicity of neutrons from interaction of μ^- mesons at rest in Pb, Bi, Sn, and A 6221
Widom, B. *See* Rice, O. K., 6009
Widule, W. W. *See* Hicks, B. L., 3997
Wiebenga, E. H. *See* Smits, D. W., 7306
Wiedenbeck, M. L. *See* Hutchinson, D. R., 108 Kloepper, R. M., 1074
Wieder, H. H. and Kaufman, S. Plastic electrets, 32
Wiedling, T. The angular correlation of Ni^{60}, 709 A metastable state of V^{52}, 8652*

land, K. Absorption spectra of gaseous radicals in thermal equilibrium, 1526. *See also* Barrow, R. F., 3992; Sulzer, P., 4697
ner, E. *See* Michels, W. C., 4309
ner, M. Energy and angle distribution of the photoprotons from deuterium, 2704
ner, N. Optics and the theory of stochastic processes, 3961
ringen, J. S. van. *See* van Wieringen, J. S.
gins, T. A. *See also* Rank, D. H., 1491, 3140, 3983–4, 7571
gins, T. A., Shull, E. R. and Rank, D. H. Rotation vibration bands of some symmetric top molecules under high resolution, 7580
htman, A. S. *See* Wick, G. C., 24
ner, E. P. The measurement of quantum-mechanical operators, 1374. Derivative matrix and scattering matrix, 4606. *See also* Inönü, E., 7465; Teichmann, T., 3449; Wick, G. C., 24
g, E. O. *See* Dropesky, B., 1061; Fink, R. W., 7869
n, H. P. J. A new method of melting ferromagnetic semiconductors. $BaFe_{18}O_{27}$, a new kind of ferromagnetic crystal with high crystal anisotropy, 799. Ferromagnetic domain walls in Ferroxdure, 8547
n, H. P. J., Gevers, M. and van der Burgt, C. M. Note on the high frequency dispersion in nickel zinc ferrites, 8536
n, H. P. J. and van der Heide, H. A Richter type after-effect in ferrites containing ferrous and ferric ions, 8571
nen, M. H. J. and Taylor, H. A. The effect of 1470Å irradiation of nitrogen-hydrogen mixtures and of ammonia, 2788
ngaarden, J. G. van. *See* van Wijngaarden, J. G.
s, H. de. *See* de Wijs, H.
sman, R. A. Probability that two diffusing molecules will collide, 3028
cock, W. L. *See* Ring, J., 4738
cox, H. A. *See* Cartwright, W. F., 7954
cox, W. S., Brannock, K. C., DeMore, W. and Goldstein, J. H. The microwave spectrum and general properties of ethyleneimine, 4015
cox, W. S. and Goldstein, J. H. Evidence for a completely planar structure of pyrrole from its microwave spectrum, 366
d, J. J. and Reid, J. M. The effects of biological tissues on 15 Mc/s pulsed ultrasound, 5813
de, H. Accelerometers, 3894
de, K. A., Zwolinski, B. J. and Parlin, R. B. The reaction occurring in CO_2–H_2O mixtures in a high-frequency electric arc, 8755
dermuth, K. The limits of the quantum theory of wave fields, 4611. Remarks on the Born–Oppenheimer approximation for the treatment of collision problems, 7454
dt, R. On the difference in chemical composition between high- and low-velocity stars, 6437
es, D. R., Smith, B. W., Horsley, R. and Thode, H. G. Fission yields of the stable and long-lived isotopes of cesium, rubidium, and strontium and nuclear shell structure, 3608
ke, C. R. *See* Tobias, C. W., 7242
kens, J. *See* Long, F. A., 8271
ker, P. and Mercier, A. Remarks on the time-singularity, the use of a homogeneous quantum formalism and on the uncertainty relation between time and "energy," 7423
kes, M. V. World-wide oscillations in the earth's atmosphere, 5238
kes, M. V. and Stringer, J. B. Micro-programming and the design of the control circuits in an electronic digital computer, 7376
kes, M. V., Wheeler, D. J. and Gill, S. The preparation of programs for an electronic computer, 2139
kie, M. J. Some automatic devices for use on tidal models, 6519
kie, M. J. and King, R. F. A wave-height analyser, 8258
kins, J. E., Jr. *See* Goldstein, H., 4321
kins, J. J. *See also* Brinkworth, M. J., 5068; Goward, F. K., 5067, 5074
kins, J. J. and Goward, F. K. Alpha-emitting levels of ^{8}Be with isotopic spin $T = 1$, 8657
Wilkins, M. H. F. and Norris, K. P. An easily used ultra-violet microscope objective, 1567
Wilkinson, D. H. Possible breakdown of isotopic spin and charge parity selection rules, 6182. Isotope spin selection rules. II. Electric dipole transitions without change of isotope spin in nuclei of $T_z = +1$, 8639. Radiative widths of dipole transitions in light elements, 8664. *See also* Carver, J. H., 2709, 7926; Jones, G. A., 429, 1088, 3577, 6183
Wilkinson, D. H. and Jones, G. A. Isotopic spin selection rules. I. Radiation from ^{16}O, 8638
Wilkinson, M. K. *See* Shull, C. G., 8525
Wilkinson, R. G. *See* Roggenkamp, P. L., 1869
Wilks, E. M. An interferometric investigation of the abrasion hardness properties of diamond, 1995. An interferometric examination of polished diamond surfaces, 2384
Wilks, J. *See* Webb, F. J., 7632
Willard, D. *See* Dayton, B., 7177
Willard, G. W. Ultrasonically induced cavitation in water: a step-by-step process, 5886
Willard, H. B. *See also* Bair, J. K., 5060; Kington, J. D., 3537
Willard, H. B., Bair, J. K. and Kington, J. D. The reactions T(p, n)He^3 and T(p, γ)He^4, 6226
Willard, J. E. *See* Hornig, J. F., 515
Willems, J. Oriented overgrowth of crystals on talc and cadmium iodide, 5199
Williams, A. O., Jr. Two-electron self-consistent field, 5862
Williams, D. *See* Szwarc, M., 8750; Yu Ting, 2618
Williams, D. E. *See* Powles, J. G., 1612
Williams, E. C. Anisotropic lattice distortion in evaporated deposits of face-centred-cubic metals, 1968
Williams, E. S. *See* Tate, J. F., 2644
Williams, F. C. and Clapper, F. R. Multiple internal reflections in photographic color prints, 8173
Williams, F. E. *See* Johnson, P. D., 2368; Prener, J. S., 4736
Williams, G. C. *See* Jones, F. Llewellyn, 1655, 6066
Williams, H. J. and Bozorth, R. M. Magnetic study of low temperature transformation in magnetite, 8534
Williams, J. *See* Mott, B. W., 8052
Williams, Q. *See also* Weatherly, T. L., 4951
Williams, Q., Cox, J. T. and Gordy, W. Molecular structure of bromoform, 367
Williams, R. C. and Wallace, P. R. Linear film growth in tarnishing reactions, 8049
Williams, R. L. *See* Mills, I. M., 6638
Williams, S. E. *See* Bolton, J. H., 3102
Williams, W. E. Solution of a modified Poisson–Boltzmann equation for a single plane double layer, 5163
Williams, W. F. *See* Allen, K. R., 7371
Williamson, C. Frequencies resulting from distortion, 2285
Williamson, D. E. Cone channel condenser optics, 104
Williamson, E. M. Energy in the nuclear field, 7452. *See also* Flint, H. T., 4603, 7424
Williamson, G. K. and Smallman, R. E. X-ray evidence for the interstitial position of carbon in α iron, 8794
Williamson, W. F. and McCloy, J. A float type airflow meter for use on beds of agricultural grains, 6547
Willig, F. J. *See* Koski, W. S., 643; Walsh, J. M., 2994
Willis, B. T. M. Crystal structure and antiferromagnetism of CrSb, 8528
Willis, B. T. M. and Rooksby, H. P. Crystal structure and antiferromagnetism in haematite, 2825
Willmarth, W. W. and Nagamatsu, H. T. The condensation of nitrogen in a hypersonic nozzle, 187
Willmott, J. C. *See* Green, L. L., 8682
Wills, M. S. A rotating coil fluxmeter, 313
Wilman, H. *See* Evans, D. M., 7198
Wilsdorf, H. and Kuhlmann-Wilsdorf, D. Electron microscope observations of the surface of stretched pure aluminium, I, 6252; II, 6253; III, 6254
Wilska, A. A new method of light microscopy 3198, 5431
Wilski, H. *See* Kortüm, G., 8736
Wilson, A. C., Jr. *See* Tyler, W. W., 2463
Wilson, A. H. The diamagnetism of quasi-bound conduction electrons, 6930

Wilson, A. J. C. On the possibility of determining the symmetry of a crystal by X-ray structural analysis, 6315. *See also* Rogers, D., 8079

Wilson, A. R. W. *See* Hopper, V. D., 8810

Wilson, B. G. *See* McCusker, C. B. A., 6928

Wilson, B. L. Calibration of load measuring devices, 2977

Wilson, B. W. The sedimentation of dilute suspensions of microscopic spheres in water, 3692

Wilson, C. D. V. The origins and nature of microseisms in the frequency range 4 to 100 c/s, 5226. An analysis of the vibrations emitted by some man-made sources of microseisms, 5227

Wilson, E. *See* Bainbridge, K. T., 4985

Wilson, E. A., Jr. *See* Bair, E. J., 7551

Wilson, E. B., Jr. *See* Kivelson, D., 353, 6996–7

Wilson, E. D. *See* Kraushaar, J. J., 5002

Wilson, G. W. *See* Bates, L. F., 8550

Wilson, H. W. and Barkas, W. H. A test of the charge symmetry hypothesis: positive to negative pion production ratio obtained in bombarding carbon with alpha-particles and protons, 2686

Wilson, J. G. *See also* Rochester, G. D., 1717

Wilson, J. G. and Butler, C. C. A note on the measurement of lifetime of unstable particles, 1716

Wilson, K. E. *See* Beranek, L. L., 3069

Wilson, L. T. *See* Roberts, N. F., 3380

Wilson, M. K. *See also* Allen, H. C., Jr, 1012; Hawkins, J. A., 2343, 6623; Perkins, W. D., 745; Polo, S. R., 2350, 6620

Wilson, M. K. and Polo, S. R. The infrared spectra of NF_3 and PF_3, 744

Wilson, R. A formula for thick target bremsstrahlung, 6851. Analysis of photonuclear reactions, 7141

Wilson, R. R. Radii of mirror nuclei, 377. Scattering of 1·33-MeV gamma-rays by an electric field, 6215

Wilson, R. S. *See* Titterton, E. W., 5542

Wilson, T. N. *See* Weissler, G. L., 4179

Winans, J. G. Demonstrations with half-wave plates, 3189. *See also* Millar, G. H., 6732

Winans, J. G. and Heitz, M. P. The energy of dissociation of Hg_2, 352

Winch, G. T. Colour television: some subjective and objective aspects of colour rendering, 170

Winch, G. T. and Young, B. M. Colour and lighting. III, 786

Winckel, F. The human voice in electrical models, 2298. The control of the human voice, 5353

Winckle, D. M. Van. *See* Van Winckle, D. M.

Winder, G. E. *See* Lloyd, H., 2223

Winegard, W. C. and Chalmers, B. Self-diffusion at silver surfaces, 7195

Wing, K. G. and Dengler, O. E. An animal respirator for use in electrically shielded rooms, 8136

Winhold, E. J., Demos, P. T. and Halpern, I. The angular distribution of fission fragments in the photofission of thorium, 447

Winkel, P. *See* Hung, C. S., 2416

Winkle, Q. Van. *See* Van Winkle, Q.

Winkler, O. Measurements with small resistance thermometers for industrial and laboratory purposes, 4769

Winogradzki, J. On the spinor form of the physical magnitudes connected with particles of spin ½, 40. On eight families of operators associated with observables of spin ½ particles, 41. On the relations between the mean value densities of the physical quantities connected with spin ½ particles, 42

Winston, H. Perturbations on exciton states in molecular crystals, 3311. Comparison of Slater's and Peckar's treatments of perturbed periodic potentials, 3480

Winter, J. *See* Brossel, J., 5662

Wintersteiger, V. *See* Maeder, D., 5037

Winther, A. Matrix elements for mirror transitions, 5688. *See also* Kofoed-Hansen, O., 3558, 5687

Wirtz, K. *See* Elsaesser, M. S., 6676

Wise, H. and Frech, M. F. Kinetics of decomposition of nitric oxide at elevated temperatures. II. The effect of reaction products and the mechanism of decomposition, 1212. Comments on the kinetics of thermal decomposition of nitric oxide, 5157. Kinetics of reaction between ammonia and oxygen in a quartz vessel, 7234

Wise, J. H. *See* Bair, E. J., 7551

Wise, M. E. Dense random packing of unequal spheres, 3629

Wiskott, D. A graphical method for the integration of the Schrödinger equation, 1331

Wiśniewski, F. J. Note on the energy levels of light nuclei, 372. On the energy levels of nuclei, 7031. Mechanical theory of the diffraction of particles by a [crystal] lattice, 8779

Witham, W. C. *See* Gibbons, J. E., 828

Witnauer, L. P., Senti, F. R. and Stern, M. D. Molecular weight of potato amylopectin as determined by light scattering, 2033

Witt, C. M. De. *See* De Witt, C. M.

Witt, H. Remarks concerning electrical fluctuation phenomena, 4793. Autodiffusion of K⁺-ions in KCl crystals, 4799. On the decrease in crystal density due to colour centres, 6308

Wittels, M. The lattice expansion of quartz due to fast neutron bombardment, 2826

Witten, L. B. *See* Few, A. V., 4790

Witzig, W. F. Creep of copper under deuteron bombardment, 1194

Woeste, K. Nuclei as compressible drops. II. Oscillations of the nuclear drops, 1838

Wohlfarth, E. P. Energy of a Bloch wall on the band picture, 3478. The exchange energy of nearly free electrons in metals, 4242. The theoretical and experimental status of the collective electron theory of ferromagnetism, 8523

Wöhlisch, E. An artifice for the immediate perception of the polarization of the light of the sky, 8130

Wolf, E. The X_n and Y_n functions of Hopkins, occurring in the theory of diffraction, 3184. *See also* Bhatia, A. B., 2386; Linfoot, E. H., 3087

Wolf, P. *See* Havemann, R., 5954

Wolf, W. P. *See* Cooke, A. H., 7630

Wolfe, H. C. and Zemansky, M. W. Remarks on "The concept of temperature" by A. R. Miller, 810

Wolfe, K. J. B. *See* Spear, P., 4400

Wolfendale, A. W. *See* Leontic, B., 2529, 8703

Wolfenstein, L. *See also* Fumi, F. G., 5698

Wolfenstein, L. and Ravenhall, D. G. Some consequences of invariance under charge conjugation, 31

Wolff, C. *See* Spencer, L. V., 4829

Wolff, H. *See* Schäfer, K., 6017

Wolff, M. M. and Stephens, W. E. A pulsed mass spectrometer with time dispersion, 8457

Wolfgang, R. L. *See* Sugihara, T. T., 6879

Wolfhard, H. G. *See* Gaydon, A. G., 7627

Wolfsberg, M. Relative energies of polar and nonpolar valence bond functions and molecular orbital method. I, 7007; II, 7008

Wolfson, J. L. A determination of the multipole character of the 637 and 722 keV γ-ray transitions in Xe^{131}, 7114. *See also* Graham, R. L., 7067

Wolfson, M. *See* Lewis, R. E., 171

Wolin, S. Ray deflection through a medium having a continuously varying refractive index, 4685

Wolkers, G. J. *See* Michels, A., 2428, 6537

Wollan, E. O. *See* Koehler, W. C., 7933, 8527

Wolnik, S. J. *See* Oliver, N. J., 8818

Woltz, P. J. H. *See* Lagemann, R. T., 756; Nielsen, A. H., 1530

Wong, E. L. *See* Simon, D. M., 6716

Wood, D. E. *See* O'Brien, J. P., 8824

Wood, D. S. On longitudinal plane waves of elastic-plastic strain in solids, 3037

Wood, E. *See* Taylor, A. E., 453, 4361

Wood, H. C. S. Ionization, pH and biological activity, 2010

Wood, J. E. *See* Tebble, R. S., 1759

Wood, R. E. A quickly made dielectric constant cell, 1622

Wood, W. A. *See* Bullen, F. P., 4426

Wood, W. W. *See* Fickett, W., 200

Woodbridge, C. L. *See* Nyborg, W. L., 2281

Woodcock, E. R. A method of calculating critical size in multi-group neutron transport theory for some simple systems, 7154

Woodruff, J. F. *See* Canody, L. J., 2802

Woodruff, O. J., Jr, McShane, W. J. and Purcell, W. J. Coolants, 7947

Woods, D. C. *See* Kash, S. W., 5115

ds, J. and Wright, D. A. Secondary electron emission from barium oxide, 905. Changes in secondary and thermionic emission from barium oxide during electron bombardment, 3401
dward, I. *See* Kennedy, S. W., 8107; Ubbelohde, A. R., 4956
dward, J. B. *See* Brown, G. E., 2674
dward, J. G. A vibrating-plate viscometer, 2228
dward, J. G. and Halter, J. B. The measurement of the lateral mechanical impedance of phonograph pick-ups, 3036
dward, P. M. Information theory, 6495. *See also* Bell, D. G., 4241
lley, H. W. The representation of gas properties n terms of molecular clusters, 2259. Note on the resonance method of measuring the ratio of the specific heats of a gas, C_p/C_v, 4774
lley, R. L. The Bauschinger effect in some face-centred and body-centred cubic metals, 7995
nton, G. A. Diffraction field of a circular aperture, 1778
ster, W. A. Physical properties and atomic arrangements in crystals, 8769. *See also* Hoerni, J., 3082; Prince, E., 8066
ley, R. D., Zemansky, M. W. and Boorse, H. A. Theoretical and experimental heat capacities of uperconducting metals, 198
ley, R. E. A third Rydberg series of N_2, 2355
mster, E. M. Properties of thermistor infrared detectors, 1479
onetz, C. Effect of weight upon the form of a horizontal] jet of liquid, 2993
rel, F. T. Discussion of units and dimensions in hysics, 15
ley, B. H. On the second-order correction terms to alues of gravity measured at sea, 2161
hington, H. R., McGruer, J. N. and Findlay,). E. Proton-proton scattering from 1·8 MeV to ·2 MeV, 6096
mann, F. X. A method of observation and measurement of water currents by means of tellurium, 254
ers, L. F. High-energy particles and the scintilla- on counter, 923
ht, B. T. Spectrometer measurement on the high nergy positrons of sodium 22, 4994
ht, D. A. A survey of present knowledge of hermionic emitters, 297, 4181. *See also* Woods, , 905, 3401
ht, D. A. [Conf. rep.]. Summarized proceedings f a conference on microwave physics—Oxford, uly 1952, 124
ht, G. T. Fluorescence characteristics of mixed rganic crystals, 8341
ht, K. H. R. *See* Grunberg, L., 575, 5699, 8442; ymer, T. B., 2485
ht, R. W. Low temperature conduction in ex- emely degenerate semiconductors, 4802. *See also* ado, G. T., 959
ch, D. Globulite units in protein crystals? 554. Molecules of the insulin structure, 1819. Proposed olypeptide chain configurations and the structure f horse hemoglobin, 8801. The hypothesis of arallel rod-like polypeptide chains in horse hemo- obin, 8802
, P. E. *See* Hatfield, P., 2029
el, M. H., On the decay of a primeval stellar agnetic field, 3831
. S. Beta disintegration, allowed and forbidden ecay, 4312
. S., Boehm, F. and Nagel, E. Radiations from aD and RaE, 7085
. S., Rustad, B. M., Perez-Mendez, V. and dofsky, L. The beta-spectrum of He^6, 412
.-Y. The exchange scattering of an electron by atom and inverse Auger effect, 389. The vibra- onal overlap integral and the intensities in band stems of diatomic molecules, 2593. The spectrum discrete eigenvalues in a negative atomic ion, 2626. e *also* Bauer, E., 4443; Corinaldesi, E., 4140; rainor, L. E. H., 2198
er, J. *See also* Foex, M., 6951; Perakis, N., 321; ai, B., 966
er, J. and Perakis, N. Magnetic properties the palladium-rhenium system, 322
Wulff, J. *See* Bartholomew, E. L., Jr, 3666
Wurm, K. On the structure of the CO^+ tails in comets, 6405
Wyard, S. J. Absorption coefficients of gamma-rays with energies between 0·3 and 1·5 MeV, 5041
Wyart, J. Determination of interatomic distances, 2813
Wyatt, L. A. A technique for cleaning hot-wires used in anemometry, 3027
Wyatt, O. H. Transient creep in pure metals, 7220
Wyckoff, H. O. *See* Motz, J. W., 3561
Wyckoff, P. H. *See* Zelikoff, M., 176, 3535
Wylie, R. G. The properties of liquid phase embryos at the intersections of plane solid surfaces, 1416. The condensation of a vapour at a crystalline surface, 1417. The freezing of supercooled water in glass, 3236
Wylie, R. G. and Harper, A. F. A. The accurate control of relative humidity, 3018
Wyller, A. A. New vibrational transition probabilities for the C_2 Swan bands, 6410
Wyly, L. D. and Zucker, A. Activities in light nuclei from nitrogen ion bombardment, 3575

Yadav, H. N. *See* Dalgarno, A., 3578
Yafet, Y. *See* Keffer, F., 4201
Yaffe, L. *See also* Bartholomew, R. M., 5086, 5091, 7062; Brown, F., 5089; Sargent, B. W., 2651
Yaffe, L., Day, A. E. and Greer, B. A. The fission yield of Te^{134}, 5088
Yagi, T. *See* Sekido, Y., 8500
Yagoda, H. *See* de Carvalho, H. G., 402
Yamada, M. *See also* Morita, M., 8660
Yamada, M. and Morita, M. On the β-ray angular correlations, 8658
Yamada, S. *See* Tanaka, S., 3936
Yamagata, Y. *See* Itoh, J., 379*, 6139–40, 7038
Yamaguchi, S. Metallic corrosion influenced by ultrasonic waves, 87. A combination of electron microscopy and optical phase-contrast microscopy, 2761. A note on "Metallic shadow-casting using a nozzle system," 6258. A chemical temperature determination of specimens in the electron microscope, 7203
Yamaguchi, S. and Nakayama, T. Titanium replica for electron microscopy, 6256
Yamaguchi, Y. *See* Kotani, T., 2741; Nakano, T., 468; Nambu, Y., 299
Yamaka, E. and Sugita, T. Energy band structure in silicon crystal, 6312
Yamamoto, D. On the anisotropic dissolution and the orientation of the phosphorescent dye, trypaflavin, in the crystal of citric acid, 2051
Yamamoto, M. Ferromagnetic behavior of nickel-cobalt alloys, 4213. Elastic constants of nickel crystals, 4416
Yamamoto, M. and Watanabe, J. Light figures of bismuth single crystals and the determination of their crystal orientations by the light-figure method. I. Preliminary investigations, 4462. On the production of single crystals of zinc bismuth and tin by sucking up from their melts, 4463. A note on the preparation of spherical single crystals of low melting metals, 4464
Yamamoto, T. *See* Umeda, K., 2401
Yamanaka, C. and Suita, T. The electron avalanche in insulators under high electric fields, 6826
Yamauti, Z. Notes on the errors associated with reflectometers using photometric sphere, 1480
Yamazaki, K. Operator calculus in quantized field theory, 2943. *See also* Katayama, Y., 3863
Yamazaki, M. *See* Ito, D., 53
Yanagawa, S. Mathematical formulations of physical quantities for *j-j*-coupling nuclear shell model, 6171
Yankwich, P. E. and Stivers, E. C. Intramolecular carbon isotope effects in the decarboxylation of malonic acid and bromomalonic acid, 2002
Yanus, R. I. Problem of the dielectric-circuit characteristics of ferroelectrics, 6029
Yao, Y. L. On the solubility of hydrogen in certain liquid metals, 7502
Yarembash, E. I. *See* Novoselova, A. V., 6318
Yarnell, J. and Goody, R. M. Infra-red solar spectroscopy in a high-altitude aircraft, 559
Yarnell, J. L. *See also* Brown, R. J. S., 272

Yarnell, J. L., Lovberg, R. H. and Stratton, W. R. Angular distribution of the reaction He^3(d, p)He^4 between 240 keV and 3·56 MeV, 4355
Yarwood, J. *See* Rossman, M. G., 8360
Yasaitis, F. L. *See* Smaller, B., 356
Yasuhara, K. *See* Fukuroi, T., 4216
Yasunaga, T. and Hukuda, K. On a beat wave-length type acoustic interferometer, 1450
Yates, A. H. *See* Lilley, G. M., 7510
Yates, E. L. *See* Wakelin, R. J., 3719
Yavorskiĭ, B. M. The motion of an electron in the field of a mercury atom, 1038. Photoionization of excited mercury atoms, 3529
Yeager, E. *See also* Dietrick, H., 5749–50
Yeager, E. and Hovorka, F. Ultrasonic waves and electrochemistry. I. A survey of the electrochemical applications of ultrasonic waves, 5747
Yeager, F., Dietrick, H. and Hovorka, F. Ultrasonic waves and electrochemistry. II. Colloidal and ionic vibration potentials, 5748
Yekutieli, G. *See* Haber-Schaim, U., 1929
Yennie, D. R. Quantum corrections to classical non-linear meson theory, 619
Yerg, D. G. Ionospheric wind systems and electron concentrations of the F layer, 5237
Yettewich, G. *See* Ingram, M., 2868
Yeung, Y.-W. *See* Le Corbeiller, P., 1441
Ying, C. F., Levy, S. L. and Truell, R. Complicated domain patterns on iron-silicon single crystals, 1165
Yoccoz, J. The influence of the Coulomb field on the angular distribution of (d, n) reactions, 5061
Yoder, P. R., Jr, Patrick, F. B. and Gee, A. E. Permitted tolerance on percent correction of paraboloidal mirrors, 7543
Yoffe, A. D. *See* Bowden, F. P., 2780
Yokobori, T. Failure and fracture of metals from the standpoint of the stochastic theory, 1952. Ductility transition and cold brittleness, 1953. The Cottrell–Bilby theory of the yielding of iron, 1983. Fatigue fracture from the standpoint of the stochastic theory, 4428
Yoli, A. H. *See* Digiovanni, H. J., 6891
Yonezawa, T. *See* Fukui, K., 3487, 3503
York, C. M. The transverse momentum spectrum of the decay products of charged V-particles, 1150. *See also* Barker, K. H., 1930
York, C. M., Leighton, R. B. and Bjornerud, E. K. Direct experimental evidence for the existence of a heavy positive V-particle, 5104
Yoshida, S. On the high energy nuclear photoelectric reaction, 443
Yoshida, S., Takeda, I., Igarashi, Y. and Arata, H. Secondary electron emission of copper-beryllium alloy, 6090
Yoshizawa, Y. The beta-ray spectra of Co^{60} and Sc^{46}, 7884
Yosida, K. Theory of the antiferromagnetic resonance absorption in $CuCl_2 2H_2O$, 3423
Yosimoto, H. Oscillatory phenomena of arc in hot cathode discharge tube. I Experimentals (characteristics of oscillation), 1658; II. Theoretical (mechanism of oscillation), 1659
Yosioka, K. and Fujibayashi, K. A portable ultrasonic outputmeter and its calibration, 699
Yoss, K. M. Photometric and spectrophotometric observations of periodic comet Schaumasse, 6395
Yost, D. M. *See* Ramsey, W. J., 7237
Yost, W. J. The interpretation of electromagnetic reflection data in geophysical exploration. I. General theory, 3761
Yost, W. J., Caldwell, R. L., Beard, C. I., McClure, C. D. and Skomal, E. N. The interpretation of electromagnetic reflection data in geophysical exploration. II. Metallic model experiments, 3762
Young, A. The contribution of the seasonal movements of air masses to the variation of latitude, 2918
Young, A. S. *See* Roberts, V., 6605
Young, B. M. *See* Winch, G. T., 786
Young, G. *See* Karush, W., 798
Young, I. G. *See* Riseman, J., 6445
Young, J. A., Jr and Uehling, E. A. Energy absorption in ferromagnetic resonance, 6133
Young, J. E. R. *See* Bitter, F., 7558
Young, J. R. Electrical conductivity and thermoelectric power of (BaSr)O and BaO, 225
Young, J. Z. *See* Roberts, F., 175
Young, R. A. *See* Ziegler, W. T., 4107
Young, R. W. and Sherwood, R. M. On plotting nois measurements, 93
Yousef, Y. L. A vibrating reed microbalance fo susceptibility measurements in weak fields, 3419
Yovanovitch, D. D. *See* Yovanovitch, D. K., 8656
Yovanovitch, D. K. and Yovanovitch, D. D. Th interaction between the α-particles and the proton inside the molecule Bi^{212}H$_3$, 8656
Yowell, E. C. *See* Blanch, G., 3787
Yphantis, D. A. *See* Waugh, D. F., 811
Yu Ting and Williams, D. Nuclear gyromagneti ratios. IV, 2618
Yuan, L. C. L. *See also* der Mateosian, E., 5970
Yuan, L. C. L. and Poss, H. L. Particle localization b means of a scintillation detector, 280
Yuan Pan Chi. *See* Chi Yuan Pan
Yuasa, T. On the K/β^+ branching ratio of ^{65}Zn, 40 5018. Preparation of a source of zinc 65 wit very high specific activity, 7906. *See also* Nahmias M., 7883
Yuasa, T. and Laberrigue-Frolow, J. Remarks o the numerical values of the Fermi function, 5295
Yudowitch, K. L. Recording radially symmetri scattering, 1562. *See also* Frank, R. M., 881
Yuill, A. M. Size effects in the initiation and growth explosion, 8735
Yukawa, H. Structure and mass spectrum of elementa particles. I. General considerations. II. Oscillat model. 7448
Yukhnovskiĭ, I. P. *See* Glauberman, A. E., 654–5
Yule, J. A. C. *See* Clapper, F. R., 8156
Yunta, J. *See* Otero, J.-M., 1310
Yur'ev, V. G. *See* Eremeev, M. A., 6102
Yuster, P. H. and Delbecq, C. J. Some optic properties of potassium iodide-thallium phospho 5391
Yutsis, A. P. The application of the method of t partial separation of variables to two equivale p-electrons, 3530. The generalization of the theo of the partial separation of variables to the case polyvalent atoms, 3531. Fock equations in man configuration approximation, 5665
Yutsis, A. P., Shugurov, V. K. and Tsyunaĭtis, G. Triplet spitting of the terms of atoms with two valen 2p-electrons, 5661
Yutsis, A. P. and Tsyunaĭtis, G. K. The Fok se consistent field for the configuration 1$s^2$2p^2 of t beryllium atom, 5660
Yvon, J. The theory of ferromagnetism and the Heise berg model, 951. *See also* Abragam, A., 967
Yvon, J., Horowitz, J. and Abragam, A. Exchan coupling between three iron ions in two orga molecules, 8561

Zabavin, V. I. *See* Bresler, A. E., 1970
Zachariasen, W. H. Crystal chemical studies of t 5 f-series of elements. XIX. The crystal struct of the higher thorium hydride, Th$_4$H$_{15}$, 8094
Zadorozhnȳi, I. K. *See* Vinogradov, A. P., 5798
Zagar, F. On the expansion of the universe. II, 580
Zago, G. *See* Cresti, M., 8474, 8494
Zaĭkov, R. Unified field theory in the 6-dimensio space, 6448
Zaĭtsev, A. A. Conditions for natural oscillations a movement of layers in a [gas] discharge, 5490
Zakovsky, J. *See* Bornschein, H., 8143
Zaleski, P. *See* Bourgeois, J., 5723; Ertaud, A., 5
Zandman, F. Photoelastic study of breakage, 2391
Zandy, H. F. The M_{IV} and M_V absorption edges ^{59}Pr, ^{60}Nd, ^{62}Sm and ^{63}Eu, 2475
Zanker, V. Quantitative absorption and emiss measurements of the acridine orange cation, normal and low temperature in an organic solve and its contribution to the interpretation of problem of meta-chromatic fluorescence, 767. *also* Scheibe, G., 1523
Zappa, L. *See* Slätis, H., 3552
Zarzycki, G. Cryoscopy in molten solvents. Cr scopy in melted lithium metaborate, 7492
Zaslavskiĭ, A. I. and Tolkachev, S. S. The struct of the α-modification of lead dioxide, 6316

slow, B., Atoji, M. and Lipscomb, W. N. The crystal structure of phosgene, COCl$_2$, 7328

tzkis, H. A certain problem in heat conduction, 6694

vadovskaya, E. K. Concerning dielectrics of high electric strength, 5493

varitskiĭ, N. V. Investigation of superconducting properties of thallium and tin films deposited at low temperatures, 5476. On the question of the superconductivity of bismuth, 5478. Properties of superconducting indium and thallium films, 7684

yon, P. *See* Ernst, P. J., 2272

nden, R. The infra-red spectrum and structure of α- and β-hexabromcyclohexane, 6627

nden, R. and Baldinger, E. The construction of a double-beam infrared spectrograph, 6604

hender, E. Electron microscope analysis of deposited layers, 5136. *See also* Rühle, R., 5134

ger, H. J. *See* Dousmanis, G. C., 8622

des, H. *See also* Livingston, R., 4966

des, H. and Livingston, R. Pure quadrupole spectra: alkyl bromides and iodides, 8321

des, N. The spectrum of gadolinium II, 4701. The spins of Li^6 and B^{10} in the shell model, 4964

’dovich, Ya. B. On the polarization of gamma-quanta in Compton scattering at 180°, 5696. The nucleon isobar as an intermediate state in the beta-process, 7888

ikoff, M. *See also* Watanabe, K., 1535, 5963

ikoff, M., Aschenbrand, L. M. and Wyckoff, P. H. Photochemical enrichment of mercury 202, 3535

ikoff, M., Wyckoff, P. H., Aschenbrand, L. M. and Loomis, R. S. Electrodeless discharge lamps containing metallic vapors, 176

kin, E. G. The waves in a pyramidal horn, 332

ansky, M. W. *See* Wolfe, H. C., 810; Worley, R. D., 198

any, P. D. Thermal degradation of polystyrene, 4458

ke, H.-J. *See* Dippner, H., 4672

er, C. On the thermal damping of elastic vibrations. Reply to Mr. E. Schreuer, 5928

er, C. and Heikes, R. R. Exchange interactions, 8521

arkov, G. F. Generation of pairs of π-mesons on nucleons, 611

danov, G. S. The theory of twins in the growth of metals, alloys and layer crystals, 5771. *See also* Golder, G. A., 6324; Ismailzade, I. G., 7336, 8799; Zvonkova, Z. V., 5782

danov, G. S. and Zvonkova, Z. V. The crystal structure of the higher oxides of metals in the first group of the periodic system, 5784

evandrov, N. D. Polarization of the fluorescence of organic crystals, 5401

udskiĭ, A. Z. X-ray structural analysis at great distances with a widely diverging beam, 7975

ukov, I. P. *See* Ageeva, N. S., 1187

ukova, N. I. *See* Fridman, Ya. B., 5738

ukovskiĭ, N. N. *See* Dzhelepov, B. S., 5689

use, V. P. and Regel’, A. R. Method of rapid determination of the temperature-conductivity coefficient of solids and liquids, 6800

kwolff, G. *See* Euler, J., 6349*

gler, C. A. Electromechanical pick-up calibration by the interferometer method, 3939

gler, H. Linear elastic stability. I. A critical analysis of methods, 6496

gler, W. T. and Young, R. A. Studies of compounds for superconductivity, 4107

, A. van der. *See* van der Ziel, A.

er, E. The degree of homogeneity of X-rays, 6070. Measurement of half-value layer for oil-shielded X-ray tubes, 6075

an, C. M. Dielectric constant of argon at 9700 Mc, 2437. A classroom antenna experiment, 2567

ing, G. M. The determination of surface tension by sessile drop measurements, with application to mercury, 3914

e, H. M. *See* Conrad, C. M., 2985

ev, N. T. Selective annotated bibliography on visibility, 4507

Zilberman, A. E. The electron in a weak periodic electric and a constant magnetic field, 3717

Zilova, T. K. *See* Fridman, Ya. B., 5738

Ziman, J. M. Antiferromagnetism by the spin wave method. III. Application to more complex systems, 3425. Quantum hydrodynamics and the theory of liquid helium, 6726. Bose–Einstein condensation in helium films, 7635

Zimen, K. E. *See* Wennerblom, A., 1052

Zimm, B. H. Simplified relation between thermodynamics and molecular distribution functions for a mixture, 6528

Zimmer, E. *See* Gatti, E., 7963; Hönl, H., 8589

Zimmer, E. L. *See* Bracci, A., 8479

Zimmerman, F. J. *See* Collins, S. C., 6148

Zimmerman, H. K., Jr and Van Rysselberghe, P. Addendum: Directed valence as a property of determinant wave functions, 4264

Zimmermann, W. The Yang–Feldman formalism and bound states, 8219. *See also* Glaser, W., 5851

Zimmt, W. *See* Kharasch, M. S., 513

Zinke, O. H. *See* Jastram, P. S., 922

Ziomek, J. S. and Mast, C. B. The bipyramidal XY_5 molecular model. I. Classical vibration problem, 5625

Ziomek, J. S., Meister, A. G., Cleveland, F. F. and Decker, C. E. Raman and infrared spectral data, assignments, potential constants, and calculated thermodynamic properties for oxalyl chloride, 2340

Zirin, H. The exchange potential in an electron gas at nonzero temperature, 5853

Zirkle, R. E. and Bloom, W. Irradiation of parts of individual cells, 8138

Zisman, W. A. *See* Fox, H. W., 7491

Zissis, G. J. *See* Deverall, G. V., 6611, 7609

Zivkovic, M. *See* Kannangara, M. L. T., 7753

Zoli, M. T. *See* Ronchi, L., 3181

Zolingen, J. J. van. *See* van Zolingen, J. J.

Zolotavin, A. V. *See* Peker, L. K., 7832

Zondek, B. and Thomas, L. H. Stability of a limiting case of plane Couette flow, 5882

Zoonen, D. van. *See* van Zoonen, D.

Zorll, U. The limit of accuracy in the measurement of the thickness of a thin film using the Köster interference double prism, 1558

Zorn, G. T. *See* Ceccarelli, M., 8671

Zuber, K. Intensification of the latent photographic image produced by beta-rays, 1077

Zubko, A. M. *See* Bresler, A. E., 1970

Zucker, A. *See* Wyly, L. D., 3575

Zucker, E. R. *See* Mandeville, C. E., 1082, 2657, 3549

Zuhrt, H. Electromagnetic radiation fields, 4225

Zünti, W. *See* Meier, R., 8704

Zupančič, Č. *See* Beckman, O., 7917

Zvonkova, Z. V. The crystal structure of thiocyanates. VI. The crystal structure of complex tetrathiocyanates of zinc, cadmium and mercury, 7329; VII. The crystal structure of the complex tetrathiocyanate of platinum, 7330; VIII. The crystal structure of the complex hexathiocyanate of rhodium, 7331. *See also* Zhdanov, G. S., 5784

Zvonkova, Z. V. and Zhdanov, G. S. A direct method of determining the signs of the structure amplitudes, 5782

Zwanzig, R. W. *See also* Salsburg, Z. W., 5904

Zwanzig, R. W., Kirkwood, J. G., Stripp, K. F. and Oppenheim, I. Radial distribution functions and the equation of state of monatomic fluids, 6741

Zwicky, F. Dispersion in the large-scale distribution of galaxies, 2906. Luminous intergalactic matter, 2907. New methods of cosmological investigation, 7384

Zwietering, T. N. *See* Michels, A., 6708

Zwislocki, J. New types of ear protectors, 1315. Review of recent mathematical theories of cochlear dynamics, 6342. Acoustic attenuation between the ears, 6343

Zwolinski, B. J. *See* Wilde, K. A., 8755

Zworykin, V. K., Flory, L. E. and Shrader, R. E. Ultraviolet television microscopy, 787

Zýkov, S. I. *See* Vinogradov, A. P., 5798

Zyngier, H. *See* Blanc, D., 7734

ALPHABETICAL SUBJECT INDEX

References to individual abstracts are grouped under headings which represent, in the main, general subj or categories rather than specific names. In the absence of a heading for a particular subject sought, a more gene heading should be consulted. E.g. "Zone plates" would be found listed under "**Diffraction**"; "Barkhausen disc tinuities" would be found under "**Magnetization.**"

The headings (**bold type**) are arranged in alphabetical order, sub-headings being differentiated by the use of lo case type for the initial letter. Minor groupings of entries have been made by indentation, under an introduct heading, whose first phrase is intended to be repeated before each of the following indented entries. Copious cro references are provided to direct attention to relevant headings.

At the end of the Index (for convenience in reference) will be found a collected list of all the headings employ grouped into sections by subject on the same basis as the monthly issues of *Science Abstracts*. The reader recommended to inspect this list before commencing a search, so that no heading relevant to his subject may overlooked.

Substances. The names of a large number of elements, compounds and substances are included as headin abstracts containing significant physical information are entered under these (with the exceptions noted below) well as under the appropriate subject headings. Since the index is intended for the use of physicists, no spec regard has been paid to exact chemical designation, and as far as possible the familiar names have been used compounds. Only the simpler of organic compounds have been listed by name. For the present, no entries un substance names have been made for the following: Alloys; most minerals; Crystal structure, molecular; Luminescen unless of pure substances; Spectra, including Luminescence spectra and Raman spectra; Nuclear species. The nar of substances and nuclei in these categories are, however, quoted in the entries under the respective subject headin Substance headings have not been included in the Collected List of Headings at the end of the Index.

Suggestions for the extension and improvement of the Index will be welcomed.

An asterisk (*) following an Abstract Number indicates that an Erratum or Correction will be found on pp. x–

Abacs see *Nomograms*
Aberrations, optical see also *Optical instrument testing; Optics, geometrical*
  meridional bundles, difference formulae 105
  spherical mirrors, finite-difference eq. appl. 1483
  rotating-prism compensators, reduction 1486*
  wave aberration with skew rays 2314
  Fresnel mirror 3084
  plastic Fresnel lenses 3085–6
  precision meas. of lens distortion 3088
  spherical, ray trace calc. appl. 3967
  decentred systems 3969
  lenses, zonal, 3rd-order methods 4689
  optical systems, simultaneous fine correction 5374
  microscope objectives, effect on contrast 5379
    reduction 4050
    3rd-order spherical, image quality 8307
  chromatic, of lens compensating grating spectrograph astigmatism 6602
  paraboloidal mirrors, permitted tolerance on correction 7543
  models illustrating coma and astigmatism 7544
Abrasion see also *Hardness*
  crystals, mutual grinding, anisotropy 1199
  Holm's theory modification 1994
  diamonds, interferom. study 1995
  metal surfaces, radiochem. study 2128
    symposium 4400
  grinding of quartz, X-ray diffraction study 4410
  cutting tools, β-activity study 4432
  looseness of wear fragments 4434
  mutual grinding, brittle solids 6277
  flat surface contact and rubbing 8002
  Zn, rel. to Kramer and Russell effects 8442
Absorption see also *Alpha rays; Beta rays; Cosmic rays; Electrons; Gamma-rays; Mesons; Neutrons; Protons; X-ray absorption*
  acoustic waves see also *Noise abatement; Transmission*
  in granular media 674
  in mixtures of gases 675
  in van der Waals gas 682
  attenuation resulting from ionic relaxation 683*
  measurement, tube method 704
    matl. in resonance chamber 2296
    long-tube method, materials in situ 2303
    early methods 2866
    mean absorpt. coeff., by single measurement 4671
  resonators as absorbers in room acoustics 1474
    viscous dissipation effect 2270*
    broadcast studios appl. 3960
  nonlinear dissipative distortion 2262
Absorption—*contd.*
  acoustic waves—*contd.*
  streaming due to attenuated plane waves 2271
  h.f. anechoic tank design 2295
  in Fiberglas 2304
  in liq., rel. to intensity at source 3045
  in A, N, O, low pressure 3046
  porous surfaces, rel. to impedance 3050
  aircraft cabin noise prevention 3071
  membrane absorbers, broadcasting studios appl. 46
  in binary mixtures, theory 5342
  in water fog in air 5344
  materials for aircraft noise control 5367
  boundary dissipation due to viscosity 6569
  ultrasonic
  phase lag method for rubber thickness meas. 59
  image conversion by thermally induced colo changes 88
  book notice 693
  critical lengths for viscous fluid propagation 1446
  tyre inspection method 1453
  in gases, dichloroethylene vapours 1457
    gaseous SO_2 7527
    NH_3 gas 8290
  swollen Buna-N rubber study 2263
  in Pb, Cu, Al, at liq. N temp. 2272
  biological and therapeutic reactions, mech. 2276
    in blood and its components 1467, 3040
    on nerve tissue 2273
    temperature changes prod. in tissue 2274–5
  measurement, radn. press. method for liquids 306
    in liquids, calorimetric method 2269, 6558, 75 8284, 8291
    attenuation in Ge 4666
    in metals 5918
  by viscoelastic plate in liquid 3940
  relaxation mechanism 3947
  in fluids, symposium 3949
  in liquids, structural effects in mixtures 3950
    standing waves made visible 163
    in acetic acid, rel. to monomeric/dimeric equil 506
    bubble resonance, cause of chem. effects 514
    various organic liq., 15 Mc/s 1454
    thermal effects in blood 1467
    thermal effect—water, intensity rel. 1468
    water, u.v. emission 2267
    ethyl alcohol and water mixtures 2268
    meas., calorimetric method 2269, 6558, 75 8284, 8291
    intensities meas. in water 2290
    rel. to molec. motion 3001

A complete list of the Subject Headings will be found at the end of the Index.

Absorption—*contd.*
acoustic waves—*contd.*
ultrasonic—*contd.*
in liquids—*contd.*
blood and its components 3040
sonic and thermal energies equivalence 3948
systems of partially mixed liq. 4667
methyl methacrylate solutions in diff. polym. stages 5343
cavitation induction, water, step-by-step process 5886
electrolyte aq. soln., 3 to 100 Mc/s 5916
water and electrolyte aq. solns., 5 kc/s to 1 Mc/s 5917
$MgSO_4$ solutions 5919
thermal effect at 3 Mc/s and over 5920
intensity at radiator rel. to absorpt. coeff 5921
sodium acetate solutions 6555
liq., thermoelectric intensities indicator 6559
temp.-effects rel. to absorpt. 8292
anomalous, viscosity as factor 8293
rel. to struct. of glasses 8710
flotation reagent emulsification 3957
Ge, attenuation study of defects 4666
detection of stratifications in materials 7532
in magnetic single crystal, rel. to mag. props. 8602
electromagnetic waves see also *Spectra, radio wave*
microwave, by Hg vapour discharge 1774
electron/gas mixture absorption 2429
microwaves, by atm. precipitation, particle charac. influence 2571
in ionosphere 2574
F-layer and solar corona, electron-electron impacts effect 338
short waves, propagation calc. 7807
in polar liq., 3×10^9 c/s, meas. 3467
u.h.f. radiowaves in cresol dissolved in benzene 3468
in shale 3763
microwaves in Fe oxides, rel. to lattice defects 5392
ferromag. reson., beam from "common radiator" 8553
in ionized gas 8591
light see also *Atmospheric optics; Densitometry; Filters, optical; Optical films; Pleochroism; Transmission;* for Absorption spectra see *Spectra*
solutions of mixed salts 69
textbook 98
NaCl, *F*-band, enhancement by Ca^{++} 128
metals, rel. to van der Waals' cohesive energy contrib. in noble metals 139
Al films 142–3
dispersion meas., new photog. method 157
evap. metal films, photoelec. det. 158
amorphous and hexagonal Se 5966
free electrons theory 8394
alkali, optical constants, interpretation 8395
local monochromatic coeff. in "cracking" flames 141
β-band, alkali iodides, assoc. photoelec. emission 232
in AgCl containing Ag particles, plastic deform. invest. appl. 491
u.v., plane polarized absorpt. by pyrimidines 760
by fluorescent powders, meas. by diffuse reflection 1537
Au and Ag films 2318
bands assoc. with Ge 4001
high polymer invest. appl. 4024
polarized, absorpt. by anthracene 4711
suspensions, rel. to wavelength 761
integrated absorpt. for CO_2 vibration-rotation bands 762
crystalline thoria 763
optical filters survey 765
crystalline powders, by diffuse reflectance 1536
X-ray induced bands, alk. earth compds., enhancement 1538
meas. by reflection method 2316, 3092
β-Ag_2S, temp.-dependence 2338
S, vapour, liq. and soln. 2356
AgBr, photoelec. 2360
in liquids, rel. to molec. motion 3001
PbTe and Si, coeffs. inter-relation 3094
thin films, simultaneous thickness det. 3177
exciton theory 3311
symmetrical polymethine dyes, calc. 3487

Absorption—*contd.*
light—*contd.*
prism matl., effect on resolving power 3966
crystals, dispersion formulae 3973
BaO, rel. to temp. 4031
atm. water vapour, statist. model 4510
multi-layer dielec. films, 4000 to 4600 Å 4738
atm. gases, cross-sections, table 5236
uniaxial crystals, reflected light det. 5380
colour centres in alk. earth halide crystals, spectral location 5399
special PbS cell, props. 6056
O_2, effect of added N_2 6643
in sodium vapour 6644
by trapped electrons in crystals 7296
natural and synthetic backmanite 7548
Mg vapour, cross-section 8325
infrared
liquid Se, near i.r. 106
Ge, high-purity single crystal 144
p-type, new i.r. absorpt. bands 130
injected carriers effect 6780
entire CO_2 bands, near i.r. 759
by large-drop water sprays 1575
PbS, PbSe, PbTe, 0·5–3 μ 3093
high temp., modulated-beam meas. 4719
crystalline lens of eye 8142
Abundance ratio see *Elements; Isotopes*
Acceleration measurement
gravity, falling rule 12
accelerometers, survey 3894
electronic indicators 5313
Acetaldehyde
reaction with methyl and *t*-butoxy radicals 1202
photolysis, rotating sector tech. 5167–8
kinetic study 5743
high-intensity study 8022
Acetic acid
monomeric/dimeric equilib., u.s. study 506
Acetone
diffusion, into polyvinyl acetate 656
anomalous, into cellulose acetate 8271
pyrolysis, mechanism 7264
high-intensity photolysis 8022
Acetylene
combustion, kinetic spectroscopy 3246
gas phase reaction with O 3675
spherical explosion waves, acetylene/air 7236
π-electrons interaction 8618
Acoustic analysis
photomech. analyser for transients 84
frequencies resulting from distortion 692, 2285
complex waves, mean power meas. 695
speech, complex-freq. phase principle appl. 712
dynamic spectrograms 1471
room sound field, image-source method 719
transitory phenomena, models appl. 720
"textural" piezoelec. Rochelle salt laminae, vibr. 1469
impulse, by resonators, errors 1771
work on violins 5349
long-time average spectra 5354
vibrations of metal rings 5905
well hydrophone, piezoelectric 5930
sound waves in mud-filled wells 5931
compact filter-type analyser 5932
electrical and musical instruments 8297
Acoustic generators see also *Musical instruments*
freq.-modulated, for reverberation meas. 97
u.s. output meas. by thermal effect, water 1468
jet-edge-resonator whistles, charac. 2281
mechanical, for obstacle echo detect. 2282
transducers for u.s. wave prod. 3055
$BaTiO_3$, broad band, directional 3056
crystal arrays, point source method 3953
quartz crystal, wave field study 4668
gyrator type 5925
infrasound generation by ocean waves 6561
with wide-beam searchlight pattern 6565
edge and jet tones, review 7521
Acoustic impedance
radiation, of ribbon-type radiators 1459
circular orifices 2277
human mastoid 2865

A complete list of the Subject Headings will be found at the end of the Index.

Acoustic impedance—*contd.*
  - analogous, for circ. discontinuities and constrictions 3051
  - of elec. conducting plate 6570
- **measurement**
  - analogous impedance, of acoustic elements 705
  - waveguide apparatus appl. 3049
    - porous surfaces appl. 3050
  - motional, determination method 5924
  - resonance method 6573

Acoustic radiators
  - circular, acoustic field near 1458
  - ribbon-type, radiation impedance 1459
  - plate, complex vibrations radn. evaluation 1460
  - finite circular baffle board effect 2280
  - radiation from elastic shell in fluid 3034
  - sound field of piston source 3047
  - baffled piston, transient loading 3053
  - baffled strip, transient loading 3054
  - piston in wall, radn. resist. formula 3057
  - efficiency meas. by reverberant room 3059
  - horn loudspeakers, air chamber invest. 3060
  - velocity field radn., compressible fluid 3951
  - gas-turbine exhaust, pattern 5366
  - electrodynam. loudspeakers, distortion meas. (book) 7531

Acoustic transducers see also *Acoustic generators; Microphones; Sound reproduction*
  - piezoelec. vibrators, design and charac. 1461
  - $BaTiO_3$, theoretical sensitivity 1462
    - circular, temp. invar. impedance point 3058
    - prepolarized, response and dielec. loss 6562
  - in acoust. meas., tape recording storage 6560
  - optimum, equivalence of, statist. method 6563
  - crystal, performance interpret., graphical aids 6564
  - transient-testing system, pick-up appl. 6566

Acoustic wave propagation see also *Absorption; Dispersion, acoustic waves; Liquid helium, sound propagation; Shock waves; Velocity, acoustic waves*
  - the "radiation principle" 86
  - in tubes, through heat source 671
    - freq. rel. to dimensions and gas disch. press. 672
    - periodic fluid flow, hydrodynamic analogy 673
    - short, small-signal impedance 2278
    - attenuation, meas. 3942
    - large amplitude, constants meas. 5911
  - in granular media 674
  - polarization in cubic crystals 691
  - acoustic field, near circular transducer 1458
    - of piston source 3047
    - 2nd-order, energy intensity rel. 3048
    - velocity, in compressible fluid, radn. from 3951
    - turbulent jet, Schlieren photog. 7522
  - nonlinear dissipative distortion, moderate amplitudes 2262
  - steady rotational flow generation 2266*
  - stream due to attenuated plane waves 2271
  - outgoing wave cylind. coordinates, phys. expression 2279
  - 2nd sound vel. calc., various media 2420
  - between plane parallel plates 3032
  - noise, in continuous media, theory 3039
  - acousto-electric effect 3066
  - liq. and solids, rel. to internal press. 3898
  - 1-dimens., finite amplitude, expression 3941
  - elastic spectrum in AgCl from X-ray scatt. 4472
  - anomalous phase prop. near focus 4669
  - liquid-filled hole, surr. by solid 5338
  - influence of meteorolog. conditions 5341
  - vorticity, surface and volume sources 5345
  - solid delay lines 5347
  - large amplitude, resonant systems behaviour 5908
  - resonance peaks in gels and glasses 5909
  - in rods, large amplitude, constants meas. 5911
  - in gross mixtures 5912
  - transmittivity of plates, effect of losses 5922
  - in medium with random fluctuations 6553
  - boundary dissipation due to viscosity 6569
- **ultrasonic**
  - in Xe, crit. temp. region 676
  - textbook 693
  - in Pb, Cu, Al, at liq. N temp. 2272

Acoustic wave propagation—*contd.*
- **ultrasonic**—*contd.*
  - phase microscope visualization method 2286
  - in liquids, review 3043
    - ultrasonics textbook 693
    - viscous, critical lengths 1446
    - demodulation 1447
    - relaxation in glycerol, rel. to dielec. relax 1456
    - effect on narrow light beam 2388
    - partially mixed systems 4667
    - electrolytes, effect on conductivity 7241
  - plate thickness meas. by harmonics, results 3935
    - lower order resonance 3936
  - through viscoelastic plate in liquid 3940
  - field of vibr. quartz crystal 4668
  - dispersion of pulse in tube 5346

Acoustic waves see also *Diffraction, interference, Elastic waves; Shock waves; Ultrasonics*
  - emission from electron, rel. to superconductivity
  - elec. network duality appl. 1441
  - method for rubber-like matls. acoust. freq. det.
  - KI oxidation, rel. to wavelength 2018
  - energy in gas, gas analysis appl. 2038
  - finite amplitude, one-dimensional gas dynam. 3038
  - u.s., light diffraction angular dependence 4743
  - momentum and inertia props. 6572
  - equivalent thermal energy 7529
  - 50–1000 c/s, effect on water jets 7534

Acoustical laboratories
  - reverberation chamber 697

Acoustical measurements see also *Flames, sensi Interferometry;* and under separate subjects, *Intensity measurement*
  - frequency, instantaneous meas. of varying 91
    - two-oscillator method 1470
  - sound transmission in buildings, American European methods 92
  - reverberation, device for rooms and loudspeaker
    - warble tone and white noise methods 2302
    - absorpt. coeff. method 4671
  - reverberation chamber for testing acoustic m 697
  - velocity, systematic errors in indirect method 70
    - field meter 5933
  - absorpt. coeff. of materials, tube method 704
    - in resonance chambers 2296
    - in situ 2303, 4671
  - noise meas. problems 714
    - machinery noise 3073
  - noise-reducing piping components, eval. tech. 7
  - radiation from plate in complex vibrations 1460
  - Rayleigh disk operation, initial-throw method 2
  - probe-tube microphones, calibration and use 22
  - h.f.-anechoic tank design 2295
  - absorption, early methods 2866
  - loudspeakers, efficiency by reverb. room 3059
    - electrodynamic, distortion (book) 7531
  - u.s. absorpt. coeff., liquids 3068, 7528
  - attenuation in a tube 3942
  - sound receiver calibration, standing waves me 3958
  - automobile horns, sound charac. and distrib. 46
  - ceiling reflection, u.s. method 4674
  - large amplitude propag. constants, rods and 5911
  - tape recording technique for transducers 6560

Acoustics see also *Architectural acoustics; Atmosp acoustics; Hearing; Noise; Resonators; S reproduction; Speech; Ultrasonics; Vibrations*
  - introductory text-book 666
  - imitation of natural sounds 2288
  - acousto-electric effect 3066
  - equivalence of sonic and thermal energies 3948
  - use of shadow method 5907
- **musical** see also *Musical instruments; Scales, mu*
  - pipes, factors affecting frequency 672
    - organ flue pipe, review 4661
    - primary *Pfeifenton* freq. rel. 5350
  - pitch discrimination, differential freq. sensitivity
  - complex note representation 1466, 6568
  - imitation of musical tones 2288
  - telephone observation of phenomena unreliable

- **Acoustics**—*contd.*
  - **musical**—*contd.*
    - physiol. and psychophysiol. basis of musical taste 5262
    - recent work on violins 5349
    - vibrating metal rings 5905
    - information of elementary auditory displays 6341
    - vibrato, stroboscopic invest. 7535
- **Acrolein**
  - reaction with methyl and *t*-butoxy radicals 1202
- **Adhesion**
  - bonding of thin films 496
  - dipole interactions with metals, theory 518
  - two polished brass surfaces, meas. 2772
  - nature of friction coeff. 3671
  - metal-polymer, electron atmospheres influence 4433
  - Cu, Ag, Au, Al films on Cr on glass, epitaxial growth 5770
  - adhesion tension, method of meas. 8727
- **Adsorbed layers**
  - effect on thermionic emission 297
  - He, on silica gel 805
    - at high saturation, on Al 7636
  - evaporation of water through 2795
  - N, phase transitions 2796
  - on solids, phase transitions 3694
  - argon, low coverage, thermodyn. props. 5176
  - vapours on silica, dielectric behaviour 5180
  - N, A and O at high saturations on Al 8033
  - effect on AgI nucleation powers 8128
- **Adsorption** see also *Chromatography; Films; Heat of adsorption*
  - inter- and intramolecular energy transfer, hydrocarbon-hydrocarbon systems 347
  - dipole interactions with metals 518
  - dropping Hg electrodes invest. methods 526
  - surface phenomena invest. by "tensammetry" 527
  - fatty acids on paraffin, Traube–Duclaux law extension 1228
  - at liquid surfaces, kinetics 2030
  - dynamical character (book) 2031
  - solids theory, surface props. 2032
  - O, chemisorption on Ni 2477
    - on W, accommod. coeff. tech. 4452
    - on W, and surface reaction, field emission study 7256
    - sorption by Ni films 8747
  - H_2O on porous glass, mechanism 2794
  - contact potential meas. appl. 3284
  - from binary mixtures 3695
  - evap. film studies, gas microintroductor 3696
  - polymer, statist. mech. 3697
  - vapours on silica gel, dielec. props. 4453
  - associated luminescence effects 4721
  - water, proton mag. reson. line width 4912
  - multilayer isotherms 5177
  - gases on siloxene, molecule interaction 5178
  - orientational polarization of polar molecules 5179
  - neutron-irradiated graphite 5181
  - *n*-pentane, *n*-propyl chloride on Zn and Zn phosphate films 6299*
  - electronic interaction in chemisorption 6300
  - methane on rutile, thermodynam. props. 6737
  - mathematics of column processes 7228–9
  - C on W, surface reaction, field emission study 7256
  - of gases at very low press. by Th 7506
  - in l.f. electric discharge 7698
  - organic acids, dipole moments meas. 7827
  - adsorbed gases effect on surface denitrification 7966
  - N, ferromag. powder particle size meas. method 7974
  - soluble ionized surface layers, α-recoil study 8034
  - sorption of acetone by cellulose acetate 8271
  - HeII on glass 8369–70
  - surface, soln. sodium dodecyl sulphate, radio-tracer method 8745
  - in layers of adsorbent 8746
  - H sorption by Ni films 8747
  - **measurement**
    - isotherms and magnetic susceptibility, simult. meas. 948
- **Aerials** see *Electromagnetic waves, radiators*
- **Aerodynamics** see also *Flow, gases; Jets; Shock waves; Supersonic flow*
  - possible cross-viscosity effect in air 73
  - fluid dynamics (book) 640
- **Aerodynamics**—*contd.*
  - projectiles charac. det. in wind tunnel 663
  - in physics teaching 2229
  - 2-dimensional gas dynamics, hodograph eq. transformation 3024
  - interferometer for flow invest. 3180
  - variable contrast study of fields 3223
  - limiting line in a simple wave 3928
  - airship theory 5329
  - classification of aerodyn. noise 5361
  - analysis and reduction of propellor noise 5362
  - supersonic bang, theory 7510
- **Aerosols** see also *Foams*
  - particle growth, diffusional processes 1225*
  - micromists, fineness, air/liquid flow influence 2028
  - electrification by spraying, statistics 2433
  - charge distrib., instrument 2792
  - ageing, elec. charge distrib. effect 4451
  - liquid, production by elect. atomization 5175
  - radioactive, due to atomic explosion, path 7362–3
  - α-radioactive, props., max. dose and meas. 7856
  - elec. precipitation, radioactive glass sphere study 8031
  - atm., collection and observation method 8123
  - analyser for total mass and charge meas. 8744
- **Air**
  - ionization by electrons and α-particles, energy 933
  - l.p. discharge, Crookes dark space field 1664
  - luminescence due to α-particle irradiation 3174
  - refract. index at 9200 Mc/s 3455
  - viscosity at 50°, 100°, 150°C, up to 200 atm. 3926
  - sound vel., shock tube meas. 3943
  - diffusion coeff. in water, bubble method 4649
  - dispersion formula for standard air 4690
  - thermal conductivity, 0–50°C 4760
  - form of neg. pre-breakdown discharge 4819
  - elec. breakdown, sphere-plane spark gap 4820
  - elec. conductivity at high press. and temp. 5471
  - flow in tube near critical point, exp. invest. 6535
  - stopping power for H, He, N, Ne ions 6868
  - pre-breakdown currents 6897
  - as coolant for nuclear reactors 7947
- **Alcohol** see individual alcohols
- **Alkali halides** see also individual halides
  - colour centres, paramag. reson, study 323
    - *F*-centre formation during irradiation 1250
    - at 5°K 1251
    - effect on elec. conduction 2445
    - *F*-bands in mixed crystals 2812
    - absorpt. band maxima, latt. param. correl. 3721
    - discoloration by cathode rays 6311
    - KCl–KBr mixed crystals 8775
  - oriented crystall. overgrowth 2806
  - dimerization, r.f. spectrum invest. 3490
  - crystals, polarization fields and reson. freq. 4082
  - instability and melting 4471
  - reorientation on mica 5200
  - scintillations 5405
  - photochem. processes at low temps. 5770–1
  - u.v. absorption spectra, dissociation energies 6641
  - cathode-ray excited, long period afterglow decay 6665
  - crystals, photocurrent, space-charge buildup and field emission 8397
- **Allotropes** see *Thermal transformations*
- **Alloys** see also *Crystal structure, molecular; Steel*
  - Kirkendall effect in 480
  - oxidation, diffusion processes determining rate 481
    - selective, of oxide films 1977
    - at high temp., mech. 3637
  - metallurgical equilibrium diagrams (book) 482
  - ferromagnetic, satn. magnetization 954
    - saturation moment, collective electron theory 8516
    - recent developments 8552
  - volatile components, h.f. furnace for fusion 1322
  - cold-worked, elec. resist. rel. to deformation temp. 1648
    - Matthiessen's rule validity 4422
  - ternary superlattice formation 2080
    - X-ray study 4485
  - diffusion, review 3630, 7969
    - coeffs. det., rel. between methods 3631
    - solid, single- and multi-phase, coeffs. 6246
    - coeff. rel. to interatomic interaction 7968
    - plastic deformation effect on 7970

A complete list of the Subject Headings will be found at the end of the Index.

Alloys—*contd.*
- binary superlattice, lattice vibrations 4244
  - vibr. spectrum and spec. ht. 4245
- ageing, X-ray scatt. invest. 1971
- noble with transition metal, elec. resist. anomalies 2443
- atomic distrib., X-ray scatt. study 2585
- magnetostriction, review 3472
- intercrystalline cracking 3665
- internal friction, review 3674
- metal physics progress, review 3779
- binary, molten, diatomic gas absorpt. 3919
- transition metals, electronic struct. 4240
  - valency rel. to electron conc. 8035
- binary, Young's mod. rel. to comp. 4418
- thermal conductivity study 4758
- order-disorder, statist. theory 6158
  - lattice vibrations 8773
- isothermal growth of crystall. grains 6245
- electron distribution from magnetic meas. 7791
- Vegard's law 7814
- precipitation alloys (Cunico, Cunife, Alnico), coercive force study 8545
- dilute, cooperative electron phenomenon 8609
- carbides and nitrides, type *MX* 8795
- Ag, elec. resist. min. at low temps. 215
- Ag–Al, structure, X-ray study 8102
- Ag–Au, partial and collective diffusion coeffs. rel. 6248
- Ag$_3$Mg, Fermi energy effect on superlattice energy 3728
- Ag–Sn–Hg (dental amalgams), setting process 549
- Ag–Zn, atomic mobility meas. 1160
- Alcomax III, magnetically hardened, preferred direction 4219
- Alnico 5, physical and magnetic struct. 8556
- Al, elastic props. 488
  - fatigue tests, statist. interpret. 4425
  - production by electrolysis of aluminates 7244
  - natural ageing, X-ray invest. 7979
- Al–Ag, thin film structure 7199–200
- Al–Cu, single crystal, deform. by repeated blows 3653
  - exudation at slip bands 3668
  - electron theory of resistance temp. coeff. 7817
- Al–Cu–Mg, artificially aged, recovery 7997
- Al–Zn, clustering, X-ray evidence 5731
- Armco iron, Hall effects 6977
- Au, elec. resist. min. at low temps. 215
  - change of resistivity on deformation 3657
- Au–Ag, diffusion couples, porosity development 1172
  - polygonization during diffusion 1964
- Au–Cr resistance standards 6769
- Au–Pd, thin film grain size 7971
- Bi–Cs, superconductivity 6058
- Bi–Pd, superconductivity 5481
- Bi–Rb, superconductivity 6058
- brass, neutron diffract. study of cold working 1269
  - u.s. waves vel. 1448
  - adhesion between polished surfaces 2772
  - jet formation in high-vel. collisions 2994
  - β disordering by α-bombard. 3731
  - α cold-worked, stacking faults meas. 7215
  - elec. resist., cold work and anneal effect 7667
  - single-crystals, yield points 7993
- Cd amalgam, local action currents in standard cell 5165
- Cd–Sb, semiconducting props. 1638
  - impurity and intrinsic semiconduction 3306
  - thermoelect. power 7692
- Co–Ni, Hall effect 6977, 8599
- Co–Pt, permanent mag. props. 4918
- Cr–Sb, antiferromag., mag. mom. orientation 8357
  - crystal struct., rel. to antiferromagnetism 8528
- Cr–Te, ferromag. resonance invest. 5566
- Cu, resist. minimum at low temps. 215
  - dilute, residual elec. resistance 217
  - elastic props. 488
  - change of resistivity on deformation 3657
  - dislocation and solute atom 8612
- Cu–α–brass, diffusion couples, porosity devel. 1172
- Cu–Al, evap. *in vacuo*, elec. diffract. study 3642
  - transformation, electron diffract. study 5733
  - composition effect on elec. conductivity 6789

Alloys—*contd.*
- Cu–Au, effect of cold work on order 485
  - Fermi energy effect on superlattice energy 3728
- Cu$_3$Au, cohesive energy and ordering 343
  - effect of cold work on order 485
  - diffuse X-ray scatt., atomic distrib. 2585
  - isothermal ordering rate 2753
  - electron bombard. effect on order 3730
  - disorder-order trans., kinetics 4408
  - short-range order theory 7294
  - short-range order effect on elec. resist. 7816
  - ordered, 1 MeV electron bombardment 8452
- Cu–Be, sec. electron emission 6090
- Cu–Fe, X-ray line broadening from precipitati 7201
- Cu–Mn–Al, superlattice formation 2080
- Cu–Ni, vacancies and porosity 1168
  - diffusion couples, porosity development 1172
  - Hall effect 1794, 8599
  - polygonization during diffusion 1964
  - spectroscopic *g* values 2540
  - variable diffusion coeffs. calc. 2751
  - partial and collective diffusion coeffs. rel. 6248
  - spontaneous magnetization 6960
- Cu–Pt, order-disorder theory 3718
  - Fermi energy effect on superlattice energy 3728
- Cu — 4 atom % Si, elastic constants 2764
- Cu–Sn, dilute, low-temp. thermoelec. study 7690
- Cu–Zn, resist, temp. coeff., electron theory 7817
  - anomalous rigidity modulus 7986
- Duralumin, u.s. waves vel. 1448
  - jet formation in high-vel. collisions 2994
  - artificially aged, recovering 7997
- Fe, ferromagnetic state struct. 1742
  - containing V and N, anelastic effects 5123
  - C-free, X-ray invest. of quenching 6273
- Fe–C, thermal reactions 2777
  - surface tension 8260
- Fe–Cr superlattice 547
- Fe–Ni, resistance to 100 000 kg/cm^2 837
  - mag. crystal anisotropy and magnetostrictio 2579
  - order-disorder in FeNi$_3$ region 3719
  - magnetic viscosity temp. dependence 5577
- Fe–Pt, thermal expansion abnormality 4054
- Fe$_3$Pt, thermomagnetic effect 5604
  - magneto-resistance 7689
- Fe–Si, domain patterns rel. to polishing 1165
  - 3 %, Bitter figures 6146
  - sheet single crystal prep. 6306
  - powder patterns, poly- and single crystals 8549
- Gd–Mg, ferromagnetism 318
- In–Sb, magneto-resistance effect 4816
  - single cryst. prep. 8051
  - single crystals, Hall effect and conductivity 8410
- In–Pb, equilib. diagram 2754
- In–Tl, elec. resistivity 839
  - superconductivity 863
- K–Rb, low-temp. thermoelectricity study 7690
- Mg–Cd, polycrystall. elast. const. meas. 7210
- Mn nitrides, crystal struct. 546
- Nb–N, superconducting, anomalous critical curren effect 2468
- Ni–C, reaction rates with BaO 1174
- Ni–Co, ferromag. props., collective electron theor 3426
  - ferromag. behaviour 4213
- Ni–Cu, ferromag. props., collective electron theor 3426
- Ni$_3$Fe internal friction, rel. to magnetization 1756
- Ni–Fe, single crystal magnetostriction meas. 2578
  - Barkhausen noise rel. to comp. 8531
- Ni–Fe–Mo. highly permeable resistance anomali 2442
- Ni–Mn, heat treatment effect on Young's mod. an density 4399
  - ferromagnetism and order 4910
- Pb–Ag, diffusion mech. 1960
- Pb–Sn, liquid X-ray exam. 1181
- Pd–Ag, thermal and mag. props. 4064
- Pd–Re system, magnetic properties 322
- Pd–Rh, mag. susceptibilities, 20°–300°K 956

lloys—*contd.*
  Permalloy, new gyromagnetic effect 329
    65, internal friction 1765
    magnetic props. explanation 8529
    crystal, uniaxial anisotropy in mag. field 8530
  Perminvar, internal friction 1765
  Si–Al, elec. properties 841
  Si–Fe, domain struct. near cavities 1764
    magnetization, heat effects 8573
  Sn, binary, crystallization expts. 3712
  Sn–Bi, supercond., thermal resist., rel. to mag. field 865
  Supermalloy, gyromag. ratio 2552
  Zn–Ag, Zn–Cu, partial and collective diffusion coeffs. rel. 6248
  Zr–Hf, allotropic transformation 3243
lpha-ray spectra
  and Geiger–Nuttall relation 401
  from nuclear disintegrations due to cosmic rays 946
  in rare earths region 1062
  systematics 1876, 6179
    for heavier nuclei 373
  even-even emitters, fine struct. intensities calc. 5681
    patterns 8654*
  Ag, Br photodisintegration 2663, 7925
  At^{218} 5006
  from B^{10} + D, Be^8 1st excited state data 4350
  B^{11}, proton-bombarded 7917
  Be^8 breakup energy 7862–3
  d–Be reactions, magnetic anal. 2698
  Bi natural radioactivity 2653
  $F^{19}(d, \alpha)O^{17}$, magnetic analysis 1914
  ionium, fine structure 7878
  Po^{210}, Ra^{226}, new decay theory 3557
  $Pu^{239, 240}$ 1063
  Ra^{226}, 188 keV abundance 400
  Ra, Rn, RaA, ThX, Tn 5008
lpha-ray spectrometers
  magnetic analyser, focusing props. 6862
    line broadening elimination 6863
  CsI scintillation 7601
lpha-rays see also *Cosmic rays; Nuclear decay theory; Radioactivity*
  activity rel. to time, Th isotopes 393
  new, occurring in nature 399
  abundance of 188 keV of Ra^{226} 400
  U^{234-6}, specific activities 1059
  α-particle interaction and Be^8 binding energy 1839
  α-recoil, invest. of nuclear processes 1861
    ionized surface layer study appl. 8034
  spontaneous fission *v.* α-decay 1864*
  atomic electrons rôle in α-emission 1874–5
  α-radioactivity in 82-neutron region 1877
  tensor force effect on binding energy 3519
  AcK α-branching 4308
  energy-period relation, electron cloud correction 5007
  α-instability of rare earth nuclides 5680
  prod. by photons on C^{13}, N^{14}, O^{16}, Ag, Br 7142
  from C^{12}, O^{16}, photodisint. 7147
  α-radioactive aerosols, props., max. dose and meas. 7856
  Po^{210}(Ra*F*) α-disint., internal ionization 7859
  emission rel. to excitation of atomic electrons 7860
  ionium, internal-conversion-electron coincidences 7878
  theory of α-decay 7880
    new theory 3557
    quantitative theory 5010
    wave-statistical theory 7083
  α-γ coincidences, $Li^7(p, \alpha\gamma)He^4$ 8679
  from nuclear disintegrations in emulsions 8680
 absorption
  range, in water 402
    student experiment 4309
    in air rel. to range in emulsions 7084
  energy expenditure per ion pair 933, 4885
    5 MeV α-rays in He 5009
    pure gases 6118
  photometric track meas. in emulsions 1928
  by filter paper, eval. 2664
  range-energy rel., in emulsions 2882, 3370
    from $B^{10}(n, \alpha)Li^7$ 8460
  stopping power of H and He 8459

Alpha-rays—*contd.*
 angular distribution
  from $T(d, p)$ 440
  from $Li^7(p, \alpha)He^4$ 430
  $F^{19}(p, \alpha\gamma)O^{16}$, ang. correl. 1110
  radiothorium α-γ ang. correl. 1878
    quadrupole moment influence 5011
  from $N^{15}(p, \alpha\gamma)C^{12}$ 1907, 3576
  β-α ang. correl. in Li^8 decay 3555, 7091
  from D–H^3 and D–He^3, below 45 keV 4352
  theory of angular correlations 4617
  angular correl. from liquid sources 6203
  from $Li^6(n, \alpha)H^3$, 200, 270, 400, 600 keV 6231
  α-γ ang. correl. in AcC to AcC″ 7879
  from *p* on O^{18} 7916
  α internal-conversion electron correl., ionium 8655
  α-γ ang. correl. $Na^{23}(p, \alpha\gamma)Ne^{20}$ 8675
 detection, measurement see also *Alpha-ray spectrometers; Counters; Counter tubes; Dosimetry; Radioactivity measurement*
  nonhydrogenous ZnS-type phosphor screens, uniform response 148
  in A-filled proportional counter, corona region 917
  Lucite-bonded α-scintillation screens 2370
  precision counting, standard sources det. 5682
  proportional counters, intense β-ray effect 6881
  anthracene, abs. scintillation efficiency 6890
  scintillations in CsI 8339
  fluorescent light yield 8340
 effects see also *Nuclear reactions, alpha-rays*
  ionization, noble gas mixtures 291
    energy per ion pair 933, 4885, 5009
    ditto, pure gases, 6118
    in hexane 6904
    total, in A and N, Po^{210} α-particles 7881
    differential, in CdS crystals 8480
  organic molecules, decomposition 516
  low-energy delta-rays 1064
  electron ejection from Mo 1693
  damage of zircon crystals 2828
    causing He diffusion 1426
  stilbene luminescence, spatial delay 3171
  luminescence production in air, glass and quartz 3174
  β-brass disordering by bombardment 3731
  radn. induction in thin films 4449
  reduction of ceric salts and oxidation of ferrous sulphate 5759
  fluorescence, in KI(Tl) 8338
  interaction with protons in $Bi^{212}H_3$ molecule 8656
 scattering
  Univ. of Pittsburgh scattering project 270
  elastic, by O^{16} 6224
    by C^{12} 6225
Altimeters
  cosmic ray balloon flight barograph 3768
Alumina
  in fused cryolite, electrolyte charac. 509
  aluminas and their hydrates, dehydration 1261
  low temp. thermal conductivity 2400
  neutron bombard. effect on susceptibility 6956
Aluminium
  evap. films, absorpt. coeff. study 142–3
    radn. induced by α-particles 4449
    phase and intensity measurements 4718
    elec. conductivity phenomena 4797
    effect of vapour incidence on struct. 5126
    transparent in far u.v. 7582
  melting in centrifugal solar furnace 184
  fast electrons in, ionization loss and straggling 902
  slow neutron scattering, energy distrib. 1154
  single crystal, anistropic property 1193
    X-ray monochromator appl. 1254
    deformation and polygonization 2076
    method of orientation 7277
  u.s. waves velocity 1448
  acoust. props., liq. N. temp. 2272
  anomalous skin effect invest. 2458
  cohesive props., theory 2581
  electrodes, vac. spark emission charac. 3096
  anodized, water vapour effect on elec. props. 3285
  compds. with P, As, Sb, semicond. props. 3298
  cold-worked wire, elec. resistance 4109
    Matthiessen's rule validity 4422

A complete list of the Subject Headings will be found at the end of the Index.

- **Aluminium**—*contd.*
  - nature and props. of anodic films 4400
  - fatigue tests, statist. interpret. 4425
  - creep, low-stress torsional 4427
    - −196°C to 140°C 7220
  - foil, rel. transmission of negatrons and positrons 4835
    - proton energy loss 4873
    - electron energy loss distrib. 7723
  - low temp. Hall effect 4938
  - electrolytic oxide film growth and ionic current 5125
  - annealed, polycrystall., deformation by repeated blows, 5141
  - pure, stretched, electron micr. exam. 6252–4
  - distortion of long crystals by compression 6267
  - thermal cond., mag. field effect at low temp. 6698
    - below 1°K 7688
  - production by electrolysis of aluminate 7244
  - crystalline, elastic const., 63°K–773°K 7988
  - Portevin–Le Chatelier effect 7992
  - Bauschinger (work hardening) effect 7995
  - elastic wave velocity rel. to temp. 8285
  - grain boundary movement 8725
- **Aluminium oxide** see also *Alumina; Corundum; Ruby; Sapphire*
  - film, electrolytic rectification 3305
  - thin film on Al, ionic currents 5125
    - electron currents 6772
  - heat conductivity at high temp. 5995
- **Americium**
  - bibliography 4969
- **Ammonia**
  - deuterated, disproportionation 365
  - liquid, heats, free energies and entropies 824
  - Na solution in liq. NH_3 2245
  - action of X-rays on solution 3687
  - agent for nucleus prod. by u.v. in moist air 3775*
  - coeff. of fugacity 5447
  - water-ammonia soln. equilib. phases, entropy charts 5449
  - production in glow discharges 6823
  - reaction with O, kinetics 7234
  - alkali metals, solutions in liq., theory 7503*
  - gas, ultrasonic absorption 8290
- **Ammonium bromide**
  - new transition 181
  - and NH_4Cl, solid solns., transition temps. 181
  - photochemical coloration 8322
- **Ammonium chloride**
  - and NH_4Br, solid solns., transition temps. 181
  - photochemical coloration 8322
- **Ammonium dichromate**
  - crystals, new transition, detect. and meas. 800
- **Ammonium iodide**
  - 1-dimensional rotation, evidence 4253
- **Ammonium nitrate**
  - metastable phase change 8362
- **Ammonium phosphate**
  - dielec. const., 9500 Mc/s, rel. to temp. 831
  - deuterated ADP, piezoelec., dielec., elast. props. 1236
    - props. as antiferroelectric crystal 1237
  - elastic constants, det. 7991
- **Analogue computers** see *Calculating apparatus*
- **Anemometers**
  - hot-wire, new applications 1436
    - wire cleaning technique 3027
  - IMFL anemoclinometer, for fluctuating vel. vector invest. 1437
  - vacuum anemometer 8276
- **Angle measurement** see also *Optical lever*
  - angle subtended by distant object, lab. interferometric meas. 162
  - preferred orientation of polycrystals 2054
  - angle comparator, optical 2223
  - standards, calibration by interferometry 2976
  - X-ray diffract. cameras as optical goniometers 5191
  - optical goniometer for metal single crystals 7271
- **Annealing** see *Heat treatment*
- **Annihilation of electrons** see *Electron annihilation*
- **Antennae** see *Electromagnetic waves, radiators*
- **Anthracene**
  - fast-neutron scint. spectrometer use 478
  - charged particle ionization loss, density effect 932
- **Anthracene**—*contd.*
  - luminescence, X-rays and cathode rays 3163
  - polarized u.v. absorption 4711
  - electronic conductivity of single crystal 6770
- **Antimony**
  - vapour, in disch. lamp 176
  - opt. and elec. charac. (book) 234
  - diffusion in Ag single crystals, meas. 1959
  - film, changes due to electron beam 1974
  - elec. resist. rel. to mag. field 4108
  - InSb, GaSb and AlSb, semiconducting props. 48
  - thermal cond., low temp., mag. field 6698
  - molec. jet, condensation factor rel. to support, 7180
  - amorphous, structure 8715
- **Apatite**
  - growth spirals rel. to crystal habit 1242
- **Apparatus** see *Cosmic rays, apparatus; Instrumen Ionosphere measuring apparatus; Laboratory ap ratus; Radioactivity measurement, apparat Vacuum apparatus; X-ray crystallography, paratus*
- **Aragonite**
  - calcite-aragonite system phase equilib. 8007
- **Architectural acoustics** see also *Echo; Noise abateme Reverberation; Transmission, acoustic waves*
  - sound transmission meas., American and Europe methods 92
  - recent progress 94
  - direct and reflected sound, effect on distrib. rooms 95
  - reverberation meas. device for rooms 96
  - av. noise level in street, calc. 717
  - field in room, image-source analysis 719
  - transitory phenomena, reduced models, analysis
  - resonators as absorbers 1474
  - Fiberglas, sound absorpt. and vel. meas. 2304
  - Royal Festival Hall, London, charac. 3074
  - resonator absorber in broadcast studios 3960, 75
  - sound-recording and -reproducing rooms, Berlin 4
  - membrane absorbers, broadcasting studios appl. 4
  - ceiling reflection, u.s. meas. 4674
  - influence of returning sound on speech localizat 5936
- **Arcs, electric**
  - C, water-cooled, i.r. spectroscopy light source 10
  - as spectral-source, self-absorption 131
  - high-pressure, noble gases 257
    - in Xe, plasma temps, det. 875
    - Hg, continuous radiation struct. 1496
    - pos. column energy balance eq. 3340
  - similarity theorem in elec. contacts 868
  - in hot-cathode tube, oscill. phenomena 1658–9
  - mercury, cathode cooling device problems 1660
    - h.p., continuous radn. 1496
    - low-pressure, cathode streams velocity 3332
    - vapour, mechanism 4117–19
    - free-moving cathode spots, current densities 60 7705
    - cathode spot movement, 6819
    - low-pressure, energy distrib. and radial potl. v 6820
  - as u.v. radn. source (book) 2394
  - temp. from emission spectrum 2471
    - high intensity a.c. 8431
  - transient, electrode phenomena 2472, 6064
  - vacuum, initiation rel. to current density 2479
  - high-voltage, in A–N_2, afterglows 4126
  - C, as spectrophotometric radn. standard 4693
  - water-stabilized, temp. and electron density 5488
  - in A and He, characteristics 5489
  - water stabilized, in C line intensities meas. 6609
  - C, as i.r. source 6689
  - space charge near electrode, theory 6815
  - McPherson's graphite normal arc invest. 6816
  - cathode disintegration 7696
  - glow-to-arc transition 8437
  - h.f., reactions in CO_2–H_2O mixtures 8755
- **Area measurement, porous substances** see *Surf measurement*
- **Argon**
  - solid-liquid critical point 183
  - translational dispersion, theoret. and expt. 677

Argon—*contd.*
- h.f. discharge in mag. field, resonance 872
- A counters, discharge mechanism 918
- rarefied, deionization process 936
- liquid, viscosity and thermal conductivity rel. 1406
  - compressibility, molec. radius, association from sound vel. 4664
- h.f. discharges, probe meas. 1666
- compressed, intern. kinetic energy and polarizability calc. 2257
- 3rd virial coeff. 2259
- dielec. const. at 9700 Mc/s 2437
- ultrasound velocity up to 950 atm. 3041
- sound absorption, l.p. 3046
- solubility in Pyrex at 1170°c 3925
- sound vel., shock tube meas. 3943
- metastable state, lifetime 4290
- spec. heats ratio, at high press. 4773
  - resonance method 4774
  - ultrasonics meas. 7642
- ionization function for fast electrons 4861
- proton energy losses 4874
- energy per ion pair 4885
  - electrons and α-particles 933
  - with small admixtures 934
- adsorbed, thermodynamic properties 5176
- shock waves, thickness calc. 5340
  - shape and thickness 3945
- luminescence at high temp. and pressure 5406
- elec. conductivity at high press. and temp. 5471
- high current arc characteristics 5489
- ions, range/energy rel. in gases 6099
- specific primary ionization, 0·2–1·6 MeV electrons 6116
- stopping power for H. He, N, Ne ions 6868
- uniform field breakdown, formative time lags 7694
- adsorption at high saturations on Al 8033
- and He, mixtures, viscosity meas. 8273

Arsenic
- optical and elec. charac. (book) 234
- film, changes due to electron beam 1974

Arsine
- molecular structure 1821

Association
- **gases**
  - light and heavy trifluoroacetic acids 138
  - pressure virial coeffs. in terms of cluster integrals 2259–60, 5903
  - group IV B elements, molec. evap., atom cluster formation 5524
- **liquids** see also *Colloids*
  - solutions theory, cooperative orientation effects 65
  - rel. to type of fluorescence in acridine orange soln. 767
  - cohesion theory of polar liquids 1424
  - H_2O, thermal conductivity theory 4051
  - HCl in conc. solns. 4647
  - u.s. vel. study, O, N, A, CH_4, H 4664
    - solutions and mixtures 6556
  - organic liq., rel. to dielec. relax. time 4786–7
  - rel. to crystal growth step height 7282

Astronautics
- collision path from earth to moon 1335
- rocket orbit tables 6499
- rocket applications in astronomy 7381

Astronomical instruments see also *Telescopes, astronomical*
- ideal photon receiver replacing photog. emulsion 6
- parabolic surface obtained by heat deformation 172
- spectrographic equip. for 200-in. Hale telescope 2145
- highly monochromatic filter for solar study 2361
- double-image micrometer 2904, 7383
- photoelec. transit instr. 3796
- for photoelec. photometer calibration curve transformation 5833
- McDonald Observatory B-spectrograph, comets appl. 6408
- rocket applications 7381
  - equip. for solar spectrography 4567
- radio-astron., high resolution aerial 7382

Astronomical observations see also *Errors, astronomical*
- stellar radiation spectrophotom. meas. 11
- new photometric sunspot observations 585

Astronomical observations—*contd.*
- discrete radio-sources, angular sizes 1337, 2147
- cine-film study of chromosphere 1341
- star colour temperatures 1344
- aberrations, in modified Newtonian systems 1365
- Hα light photometric survey of solar flares 2151
- astron. interferometry, atm. dispersion significance 2905
- rocket photograph of Lyman-α line, sun's spectrum 4567
- telescopic, micrometeorological effects, amelioration 5269
- stellar diameters from diffraction at occultations 5841
- giant and dwarf star separation by 3-colour photometry 5843
- meteor shower, radar invest. 6391
  - radar sensitivity effect 6389
- photog. photometry of comets 6393
  - periodic comet, Schaumasse, 6395
- photometry of extra-galactic nebulae 7404

Astronomical spectra see also *Atmospheric spectra; Cosmic radiations, r.f.*
- Fe and other metals, forbidden lines significance 115
- transfer eq. and line residual intensities 2157
- astrophysics symposium (book) 3795
- CO_2, i.r., absorpt. line width 5960
- C_2 Swan bands, new transition probabilities 6410–11
- N_2^+, NO, NO^+, bands, in Schumann region, using N^{15} 6413
- CO^+, band, Baldet–Johnson system 6414
- N_2^+, $^2\Pi$–$^2\Sigma$ bands anal. 8315
- **comets**
  - spectroscopy and spectrophotometry, colloquium 6392
  - use of McDonald Observatory B-spectrograph 6408
  - OH, emission, interpretation 6409
  - C_2 Swan bands, new transition probabilities 6410–11
    - obsd. and calc. intensity profiles 6412
  - N_2^+, NO, NO^+ study in Schumann region 6413
  - emission near 4050Å 6415
  - NH_3, comparison with various excitation conditions 6416
  - emission, coincidence with new C_2H_2 spectrum 6417
  - comparison with those of earth's upper atm. 6418
  - 4050 emission band origin 6419
  - rel. to combustion spectra 6436
- **nebulae**
  - ion stratification data 3821
  - galactic line displacements and Lemaître's model 5271–2
  - collisional excitation of H in gaseous nebula 8195
  - network nebulae, excitation theory 8196
- **stars**
  - continuous, observations and theory 2916
  - new i.r. FeO band system 3993
  - Stark effect theory 4573
  - Hγ Stark broadening 4574
  - late N-type, emission near 4050Å 6415
  - O lines appearance, origin 6428
  - rel. to combustion spectra 6436
  - absorpt. lines, stellar atmospheres 7405
  - Coudé spectra, Be stars, outer atm. data 8197
- **sun** see also *Sun, radiation*
  - i.r. solar spectroscopy in high-altitude aircraft 559
  - sunspots, physical conditions deduction 2149
  - *K*-line residual intensity and contour 2914
  - photosphere turbulence, long wavelength 3808
  - from 7 μ to 13 μ, details 3812
  - from λ2285 to λ3000Å, details 3813
  - i.r. solar lines table, 1·4–2·5 μ 3814
  - u.v. to soft X-rays, rocket studies 3815
  - H $2^2S_{1/2}$ state lifetime in ionized atm. 3816
  - CO identification in earth's atm. 4497
  - D abundance data, solar atm. 4564
  - line equiv. width, resolving power effect 4565
  - presence of neutral Fe and ionized Ni forbidden lines? 4566
  - Lyman–α line, rocket photograph 4567
  - O_3 9·6 μ absorpt. band fine struct. 4568
  - i.r., absorpt. due to CO 4569
  - continuous, near i.r., solar atm. absorpt. study 4570
  - ^2D–^2P forbidden lines, neutral N, solar atm. 4571
  - line 6374Å intensity, rel. to corona temp. 5280

A complete list of the Subject Headings will be found at the end of the Index.

- **Astronomical spectra**—*contd.*
  - **sun**—*contd.*
    - intensity of Lyman-alpha line at 81 km 6427
    - O lines appearance, origin 6428
    - surface temp. det. from V line intensity 6429*
    - Na*D* lines, centre-edge variation 8193
      - **corona, prominences**
    - coronal emission lines, intensity calc. 2912
    - chromospheric line width, eclipse meas. 2913
    - chromospheric H, anomalous excitation 3810
    - model H chromospheres, emission charac. 3817
    - inner corona monochromatic fluctuations 5840
- **Atmosphere** see also *Ionosphere*
  - **composition**
    - r.f. mass spectrometer for upper air research 558
    - OH molecules formation 738
    - atm. gases, attenuation of microwaves 1301
    - chemical exploration of stratosphere 2841
    - CO, identification 4497
      - abundance var., from solar spectrum 4569
    - O_3, amount rel. to meteorolog. conditions 5233, 7348
      - absorpt. bands study 6617
    - H^3 prod., deduction from (n, H^3) meas. in N and cosmic-ray data 7935
    - impurities meas., free air and snow 8133
  - **humidity** see also *Humidity; Rainfall*
    - stratosphere, water vapour content, aircraft det. 559
    - semidiurnal wave of vapour pressure 565
    - as factor controlling refractive index 1289
    - microwave transmission, attenuation by atm. gases 1301
    - water vapour definitions and specifications 3774
    - absolute, rel. to solar radn. transmission 5242
  - **ionization** see *Atmospheric electricity; Ionization, atmosphere; Ionosphere*
  - **movements** see also *Weather forecasting; Wind*
    - turbulence, rel. to e.m. energy scattering 335
      - anal. by particle photographs 1284
      - exchange coeff., rel. to water vapour flow 3772
      - criterion 5239
    - air-masses, redistrib. rel. to earth's moment of inertia 1285
      - seasonal, effect on latitude var. 2918
    - upper atm., acoustic studies 1286
    - factors affecting refractive index 1289
      - statistical fluctuations 1302
    - rare gases, gravitational separation, evidence 2841
    - kinetic energy dissipation, lowest layers 4500
    - instability due to heating and Coriolis forces 4762
    - effect on O_3 amount 5233
    - world-wide oscillations 5238
    - influence of Coriolis force 5240
    - stratosphere winds, acoust. propag. study 5258
    - "polar tides" 5286
    - eq. of motion integrated along vertical 5801
    - development of convection in frictional layer 6329
    - effect on earth's axis of rotation 7410
    - forced flow due to heating 7485
    - upper air motion 8124
    - ionosphere, wave hypothesis 8125
    - extreme heights, Kepler motion 8126
    - stability over sea, effect on microwave propag. 8592
  - **radioactivity**
    - tracing nuclear explosions 569
    - natural, methods of meas. 1049
    - abnormal, aeroplane study 2101
    - meas. with gammameter 5251
    - dust from nuclear detonations 5252
    - atomic explosion aerosol path 7362–3
    - measurements on free air and on snow 8133
    - fluctuations, influence on counters, etc. 8647
  - **structure**
    - radio-meteorology, joint commission report 1278
      - in Japan 1300
      - in New Zealand 5592
    - upper atm., survey of density values 1279
      - research conf. 2842
      - densities, from meteor decelerations 5232
      - invest. by aircraft-launched rockets 6328
    - O_3 layer, reduced thickness diurnal var. 1280
      - optical upper limit, sharpness 2095
    - microwave refractive index, fluctuation and profile record 2856, 5257
      - equation, constants 8593
- **Atmosphere**—*contd.*
  - **structure**—*contd.*
    - radio field strength, seasonal trends 2857
    - air mass between observer and outer space 3769
    - thin atm. equilib. round central core 3827
    - information from rainwater T activity 5805
    - factors affecting v.h.f. radiowave propag. 6973
  - **temperature**
    - upper atm., survey of values 1279
      - from acoust. propag. studies 1286
    - thermal causes of world-wide oscillations 5238
    - max. at 50 km as cause of twilight discontinuit 5247
    - stratosphere, low lat., acoust. propag. study 5258
    - energy transport by radn. near ground 5802
    - calc. from rocket press. measurements 5804
    - rel. to cosmic ray intensity 7752
    - upper regions, from ozone meas. 8124
    - diurnal variations from O_3 absorption 8127
  - **thermodynamics**
    - recommended values of constants and functions 37
    - water vapour specifications and definitions 3774
    - kinetic energy dissipation, lowest layers 4500
    - temp. of co-existence, ice crystals and salt soln. dr 5243
    - stratosphere, warming by solar eruptions 7357
- **Atmospheric acoustics**
    - upper atm. winds and temps., acoust. prop studies 1286
    - stratosphere winds and temps. study 5258
    - meteorolog. conditions, effect on aircraft noise 53
    - aircraft noise propagation 5356
    - abnormal propag. over south-western U.S.A. 633
- **Atmospheric disturbances** see also *Thunderstorm Weather forecasting*
    - ionospheric, Feb. 23–8 (1952) storm 1283
      - 4 disturbances, Continental maps 5812
      - wave hypothesis 8125
    - tornado identification, spherics method 1303
    - effect on potential gradient 4514
    - instability due to heating and Coriolis forces 4762
- **Atmospheric electricity** see also *Atmosphere, rad activity; Aurora; Electromagnetic wave propa tion, atmosphere; Ionization, atmosphere; Io sphere; Lightning; Thunderstorms*
    - atmospherics, mean level rel. to intelligibility 982
      - Joint Commission report 1278
      - elec. field from lightning, variations study ap 1294
      - sources 1298
      - meteorolog. situation rel. to sferics location 12 7366
      - tornadoes, identification 1303
      - radio, propagation 1788
      - conference report 7366
      - whistling atmospherics invest. 7366, 8135
      - with very low freq. components 7806
      - simultaneously received, location method 8594
      - magnitude and waveform 8819
    - field unaffected by solar eclipse 1292
    - space charges, pos. and neg. in fine weather 1293
      - density meas. 4516
    - field var. due to lightning discharges 1294
    - dynamo currents and conductivity, rel. to geom diurnal var. 2100
    - potential gradient, meas 3282
      - rel. to weather disturbances 4514
    - new recorder 4515
    - air discharges mech. 5253
    - charged droplet development in cloud 7365
- **Atmospheric optics** see also *Night sky; Sky brightne Sunlight; Twilight; Visibility*
    - reflection and diffraction from ice crystals 568, 58
    - i.r. transmission, absorpt. by entire CO_2 bands 75
      - through fog, 4320Å to 9500Å 5803
      - factors affecting 7354
    - meteorolog. processes controlling refractive in 1289
      - turbulent fluctuations 1302
    - transmission meas., field of view influence 1291
    - O_3 layer optical upper limit, sharpness 2095
    - aerosol diffraction of light, Mie theory appl. 2387
    - spectral transmission, general charac. 2851

Atmospheric optics—*contd.*
- dispersion significance in astron. interferometry 2905
- polarization of sky light 3777, 8130, 8815
- unusual phenomena, invest. 4508–9
- water-vapour absorpt., statist. model 4510
- transmission model 4511
- solar radn. absorpt. rel. to absolute humidity 5242
- brightness of secondary scattering in twilight sky 5248
- scattered light indicatrix, props. 5810
- photopic attenuation at Khartoum 6332
- shimmering of stars, fluct. rel. to objective dimensions 6384
- twilight anomaly due to turbidity 8129
- daylight rel. to colours in landscape 8350

Atmospheric pressure see also *Barometers*
- near ground, correl. with ionospheric changes 564
- upper atm., survey of values 1279
- pressure systems behaviour study 2846

Atmospheric spectra see also *Atmospheric optics*
- N_2O 17μ 2nd fundamental 133
- press. broadened band spectra, transfer theory 4511
- upper atm., rel. to cometary atmospheres 6392, 6418
- O_3 absorpt. bands, high-dispersion study 6617
- aurora, Hα intensity var. and rapid succession effects 1296
  - enhancement of H lines, lower latitudes 2102
  - in 3300–8900 Å range 4517
  - H-lines, Doppler displacement 4518
  - low-intensity aurora, charac. 8818
  - "after-glow," excitation and duration in N 1508
  - ditto, explanation 6334
  - rapid-scanning spectrometer 6603
- twilight, Na *D*-line decay time 2095
  - O 6300 Å and 6364 Å lines, morning and evening difference 7358
  - N ^4S–^2D line intensity 8131
- night sky, OH 6333
  - rotation-vibration spectrum, intensity distrib. 738
- twilight and night sky, near i.r. OH and O_2 bands 7359
  - diatomic molec., forbidden transitions, review 3112

Atomic beams see also *Range of particles*
- magnetic resonance method for H and D h.f.s. 385
- mag. reson. meas., Pr ground state 2621
- He in H, He, air and A, charge states 4390
- high-speed, production with rotors 4627

Atomic mass see also *Isotopes; Mass spectra*
- Cl^{39} and A^{39} 391
- 42 stable nuclides, Pa through Xe 1041
- det. from disintegration energies, O to S 1042*
- K^{40} 1856
- light atoms, C^{12}, H^1 and D^2 as substandards 1857
- Ne^{20}, from nuclear decay data 1879
- nuclei $A = 17$ to $A = 32$ 2613
- S^{32} and Cl^{35} mass difference from *Q*-values 2631
- mass differences, W, Zr, Mo, Os, Ru isotopes 2632
- P^{31} 3536
- Si^{27}–Al^{27} mass difference 3537
- isotope mass determinations, energy valley surface appl. 4958
- doublets at 28 and 30, meas. 5666
- Li, Na, K 6094
- $Te^{122, 124, 128, 130}$ 7052
- Ru^{102}, Pd^{102}, Rh^{103}, Ru^{104}, Pd^{104} 7053
- O^{18}, from $O^{18}(p, \alpha)N^{15}$ 7131

Atomic weight
- monoisotopic elements, chem. and phys. values 392

Atoms see also *Elements; Nucleus*
- variational method for radiationless transitions 25
- quantum theory of matter (book) 26
- pion captured by C, O and Be, X-rays from 2*p*–1*s* transitions 1020
- X-rays from π-mesic atom 1021
- stopping power of *K*-electrons 1850
- electron ejection in large-angle scatt. 1851
- "compressed He atom," ground state 2255
  - polarizability 2256
- statist. model, compressed A, theory 2257
- recombination, I atoms in rare gases 3482
- photoionization of excited Hg atoms 3529
- orbital electron ejection in Fe^{55} *K*-capture 3556
- metal, collision dia. calc. in H flames containing alkali metals 4003

Atoms—*contd.*
- ortho-para-positronium conversion 4292
- stability of positronium 4293
- radioact. disintegrations effect on inner electrons 4332
- ion cluster formation, group IVB elements by molec. evap. 5524
- single ionization by electrons, threshold law 6117
- He repulsive potl., additivity 6162
- vibrating, electron density 7289
- radius, table for metals 7845
- electron exchange in *d* shell 8521

excitation
- inelastic electron collisions, strong coupling 383
- metastable ($^3P_0$)Hg level, prod. in reson. radiation quenching 733
  - relation to electron energy 1038
  - production in Hg($^3P_1$) react. with ethylene 1210
- metastable atoms, diffusion, de-excitation and ionization cross-sections 1706
- two-electron systems, spatial correl. 1846
- electrons rôle in α-emission 1874–5
- in β-decay 1892
- Na, in H diffusion flames 2319
- Thomas–Fermi–Dirac atom, mean excitation energy 2623
- resonance radn. decay by spont. emission 3528
- and ionization, accompanying orbital electron capture 3559
- He, cross-section 3574
- inelastic collisions, theory 4177
- noble gas metastable states, lifetimes 4290
- Ne, $^3P_2$ metastable level, temp. effect on duration 4291
  - decay of populations in $2p^53s$ levels 7044
- excitation functions for fast electrons, He 5016 Å line 4861
- Hg, by discharges in Hg arc 5485
- double excitation of 2-electron atom 5663
- H 1*s*–2*s* cross-section calc. 5664
- forbidden nebula lines, calc. 7045
- Po^{210} (Ra*F*) α-disint., internal ionization 7859
- by emission of α- and β-rays 7860

magnetic moment
- ^3S, He, nonrad. relativistic contrib. 3532
- He, in metastable triple state 7846–7
- *n*-electron atoms, relativistic contrib. 7848

structure see also *Nucleus; Spectra*
- $Hg^{199, 200}$ isotopes, energy level struct. 117
- S^2-config. isotope displacement, Eu, Gd, Yb 118
- term values in F^3 electron config. 382
- natural line shape 384
- H and D, h.f.s. 385
- atomic *g* values, perturbations 386
- electron anomalous magnetic moment 387
- $g_J(^2S_{\frac{1}{2}})$ of K, in terms of proton gyromag. ratio 388
- de Broglie wave appl. 996
- Fe group, odd terms, config. interaction 1036
- O, atomic *g*-factors 1037
  - neutral, new fine struct. 4294
  - OI($^4S^0$)$3p^3p$ term fine struct. 5948
- iterative procedures and He wave eq. 1039
- H, elec. field effect on (2^2p_0–n^2D) lines 1495
  - fine structure, improved accuracy 1847–8, 2192*
- Gd isotope displacements for 5 configurations 1500
- two-electron systems, spatial correl. 1846
- Lamb shift, H and D, corrections 1849
  - mesonic, and spin orbit coupling 6172
  - quantum mech. of rigid electron 8240
- electrons, eigenfunctions and energies det. 1852
- Cu^+ wave functions and energy levels, Slater approx. 1853
- Pr, ground state h.f.s. 2621, 7829
- form factor, Thomas–Fermi calc. 2622
  - self-consistent field calc. 7047
- Hg 6^3P_1 level, mag. reson. detect. 2624
- electron eigenfunctions and energy eigenvalues calc. 2625
- discrete eigenvalue spectrum, neg. atomic ion 2626
- γ-ray coherent scatt. by bound electrons 2674
- sextet ground level, diluted Fe alum 3430
- electronic levels, filling-in sequence 3526–7

- **Atoms**—*contd.*
  - **structure**—*contd.*
    - separation of variables, 2 *p*-electrons 3530
      - polyvalent, atoms 3531
    - $^3S_1$ He, nonradiative relativistic contrib. to mag. moment 3532
    - Hartree–Fock eq. for continuous states 3533
    - Thomas–Fermi electron density theory 3534
    - Ni and Cu *L* spectra invest. 4131
    - energy levels, h.f.s., nuclear struct. appl. 4269
    - Al^{27} $3p^2P_{\frac{1}{2}}$ h.f.s. 4286
    - Be, 3 lowest states calc. 4295
      - $1s^22p^2$ config., self-consistent field 5660
      - ditto, triplet splitting, also He $2p^2$ and C and O^{2+} 5661
    - self-consistent fields, Slater functions 4296
    - isotope shift effect calc., heavy elements 4702
    - high freq. techniques, review 4707
    - B and C, 8 variational poly-detor wave functions calc. 4968
    - metals, energy states distrib. X-ray spectra information 5495
    - Tm, Ho, Tb, Cd, Eu levels from *L*-spectra 5499
    - population inequality between Zeeman sub-levels and ground state, optical creation 5662
    - many-configuration approximation 5665
    - Mn^{++} nuclear h.f.s. 6177
    - electron distrib., electron diffract. invest. 6184
    - Sommerfeld's fine struct. const., eq. 6185
    - In^{115}, h.f.s. of resonance lines 6611
    - most probable electron config., importance 6990–1
    - automatic computing, symposium 7025
    - nucleus shielding of closed electron shells 7043
    - *K*-electron binding calc. 7046
    - single scale factor use in wave functions 7048–9
    - He I ground state, correl. energy 7050
    - Thomas–Fermi equation and periodic system 7051
    - spatial relation of electrons 7842–3
    - energy level calculation method 7844
    - e.s. energy matrices of f_4 config. 7849
    - generalized self-consistent field method 7850
    - polarizability, methods of calculation compared 7851
    - daughter atoms from A^{37} and Xe^{131m} decay, av. charge 7861
    - hyperfine structure of He^3S_1 state 8641
    - ditto, effect of nuclear structure 8642
    - free electron density in bound orbits, incomplete Fermi–Dirac function tables 8643
    - wave functions, Al III and Al IV 8644
- **Aurora** see also *Atmospheric spectra; Night sky*
  - and magnetic storms, theories 1274
  - sunlit, excitation 2103
  - radiowaves, long-duration 33 Mc/s echoes 2855
    - scattering, theory 3458
    - radar localization 4519
    - echo observations 8814
  - southern zone, homog. arcs position defn. 6335
  - excitation mechanism 7386
  - ancient obs. rel. to sunspot cycle 7400
  - description and theories review 8817
- **Balances**
  - gas-density, magnetic 2224
  - quartz helix, improvements 2979
  - silica microbalance, 2980, 6502
  - vac-microbalance for dielectrics sorption meas. 6501
  - electronic, high-speed 6503
  - differential thermobalance 8249
- **Ballistics** see also *Impact*
  - missiles, vertical entry into water 647
  - two transportation problems 2219
  - internal, reducible, non-linear differential eq. 4552
  - small time intervals chronograph 6507
  - projectile speed meas. methods 6508
- **Barium**
  - vapour, in disch. lamp 176
  - thermionic emission phenomena, monatomic layer effect 297
    - use in metal capillary cathodes 6909
    - diffusion in oxide-coated cathode 7748
    - oxide cathode activation theory 7749
  - film on Ag, contact potl. meas. 826
- **Barium**—*contd.*
  - $BaO.6Fe_2O_3$ (Ferroxdure) mag. props., preferr orientation effect 961–2
  - $Ba/BaCl_2$ system, miscibility break 1423
- **Barium chloride**
  - $Ba/BaCl_2$ system, miscibility break 1423
- **Barium fluoride**
  - phys. props, compared with CaF_2 489
  - single crystal, i.r. transmission limits 3148
- **Barium oxide**
  - thermionic emission, BaO and (BaSr)O cond tivity and thermoelec. power 225
    - BaSrCaO elec. conductivity 295
    - dispersed in W 296
    - (Ba, Sr)O cathodes, survey 297
    - activation, photocond. study 3397
    - contaminated anode emission decay 3399*
    - secondary and thermionic emission changes, r to thickness 3401
  - secondary electron emission 905
  - reaction rates with Ni/C alloys 1174
  - luminescence, and thermionic emission 1548
    - rel. to temperature 4031
- **Barium sulphate**
  - micro-spherical aggregation 517
- **Barium sulphide**
  - electronic properties 294
- **Barium titanate**
  - domain properties 208
  - ferroelectric feedback effect 209
  - dielec. props., survey 828
  - ceramics, containing $CaTiO_3$, Y_2O_3, PbTiC improved temp. stability 832
  - transducer, theoretical sensitivity 1462
    - broad band, directional 3056
    - ultrasonics appl. 3055
    - circular, temp. invar. impedance point 3058
    - wide-beam 6565
  - ceramic, hysteresis loops at higher freq. 1613–14
  - static model at room temp. 1617
  - heat capacity and entropy 3267
  - polarization dynamics 3289–90
  - self-diffusion 4405
  - ferroelectricity (book) 4785
  - single crystals, dielec. props. and optical anomali 4788
  - metastable states 5454*
  - higher transition, charac. 5455
  - dielectric props. theory, with covalent Ti–O link 545
  - effect on diel. props. of varying composition 5457
  - single crystals, temp. changes 5778
  - prepolarized, electromech. response and dielec. lo 6562
  - crystal, elec. conductivity 6771
  - polarized, rectifying property 7653
  - double hysteresis loop at Curie point 7654
  - Ba/Sr titanate permittivity, 3,000 Mc/s region 839
  - dielect. meas., 120°c transition 8392
- **Barometers**
  - for radiosonde 3767
  - cosmic ray balloon flight barograph 3768
- **Bending** see also *Stress analysis; Torsion*
  - **beams**
    - Dirac δ-function appl. 2212
    - flexural vibration, normal modes det. 3937
  - **plates**
    - optical flats, meas. 2973
    - pre-stressed circular plates 4624
- **Benzene**
  - derivs., solid state, dielec. props. 210
  - vapour, refractivity 726
  - aq. solns., effects of Co^{60} γ-radn. 1222
  - elec. conductivity, d.c. meas. 2457
  - electronic spectrum and struct. theory 3508
  - perturbed ring, molec.-orbital theory 3509
  - self-complex interaction energy calc. 5617
  - 1, 3, 5 tri F-benzene, analysis of vibrations 5634
  - photodecomposition by intense u.v. 6296
  - inter- and intra-mol. forces, nuclear mag. res. 3 solid species 6985
  - resonance energy 7010
  - Rayleigh's ratio, value and det. 7614
  - X-ray diffraction study, liq., 8265

Beryl
- growth spirals 4467

Beryllium
- fast jets from collapsing Be cylinders 643
- fast electrons in, ionization loss and straggling 902
- Compton radiation spectrum 1090
- thermal conductivity, low temp. 2400
  - high temp. 7621
- crystal, as neutron monochromator 3624
- foil, proton energy loss 4873
  - electron energy loss distrib. 7723
- low temp. Hall effect 4938
- 0·2 mm X-ray tube window 5511
- self-consistent field of $1s^2 2p^2$ config. 5660
  - triplet splitting 5661
- reflectivity in Schumann region 7605
- conductivities, thermal and elec. 7621
- sp. ht., 4°K to 300°K 7633
- properties, manufacture and use 8155

Bessel functions
- an expansion used in rheometer theory 495
- piston in wall, radiation resist. 3057
- Hopkins's X_n and Y_n, in diffraction theory 3184
- $Y_0(x)$, $Y_1(x)$, $K_0(x)$, $K_1(x)$, tables 3786
- $I_{n+\frac{1}{2}}(x)$, $(2/\pi)K_{n+\frac{1}{2}}(x)$, tables 5828
- in elasticity theory 6497

Beta-ray spectra see also *Nuclear decay theory*
- backscattered β-rays, rel. to direction and Z 265
- forbidden transitions of arbitrary order 408–9
- neutron-excess Au isotopes 1868
- neutron β-decay 2741
- cross terms in β-decay 3558
- standard lines establishment 3564
- β-decay theory, finite de Broglie wavelength effect 5023
- electron from μ-meson decay, est. 7953
- Ag^{112} 7071
- As^{70-1} 3550, 7086–7
- As, Auger lines 5044
- Au^{198}, K Auger intensities 2677
- $Au^{197m,\,198}$ 4988, 7080
- $Ba^{128-9,\,131}$ 403, 7869
- Br^{87} 1873
- Ce^{143} 1076
- Cl^{33}, β^+ upper limit 7883
- $Co^{54,\,56-8,\,60}$ 1067, 7068, 7884
- $Cr^{49,\,51,\,55}$ 396, 2654, 7075
- $Cs^{128,\,134}$ 4995, 7869
- Cs^{137}, K Auger intensities 2677
- Cu^{67-8} 7064, 7877
- Eu^{150} 7875
- F^{20} 1897, 5015
- Fe^{59} 1870
- Ga^{64-5} 5004, 7073, 7078
- Ge^{75} 398
- He^6 412
- I^{126} 4989
- $In^{110,\,112,\,114}$ 397, 2491, 4996
- Ir^{192} 5684
- K^{40} 1866
- K^{40}, liq. A meas. of shape 7886
- La^{142} 7868
- Mg^{28} 4997, 5022, 7876, 8651
- Mn^{50} 7068
- $Mo^{90,\,93m}$ 4301, 7074
- Na^{22}, high-energy positrons 4994
- $Nb^{95,\,95m,\,97}$ 2657, 3549, 3552, 5000
- Np^{240} 7874
- $Os^{185,\,191,\,193}$ 4995
- P^{32-3} 1132, 7904
- P^{29}, β^+ spectra upper energy limits 7883
- Pd^{112} 7071
- $Pu^{239,\,240,\,241,\,243}$ 1068, 4305
- RaB 5685
- RaC 4987, 6196
- RaD 2655, 6205, 7085, 7872
- RaD, Auger lines 7900
- RaE 4325, 7085
- RaE, low energy 4138, 5686
- $Rb^{82,\,84,\,87}$ 1867, 1880
- Rh^{106} 404, 5675
- Sb^{124} 1083, 7081
- $Sc^{43,\,46-7}$ 1075, 6200, 7069, 7884

Beta-ray spectra—*contd.*
- Se^{75} 4999
- Si^{31-2} 1052, 7876
- Sn^{125} 1082
- Sn^{113}, K Auger intensities 2677
- Sr^{90}–Y^{90} equilib. mixture av. energy 1065
- Sr^{91} 7077
- T 1066
- Te^{131} 2652
- Th^{231} (UY) 1881
- ThB, low-energy 4138
- meso Th 2 7090
- Ti^{51} 1872, 4992
- Tl^{204}, scint. spectrometer study 1069
- Tm^{170} 7067
- Tm^{179}, β–γ ang. correl. 1884
- $U^{237,\,240}$ 2656, 7874
- UX_1 and UX_2 7088
- UX, Auger lines 5044
- $V^{46,\,48}$ 1869, 7068
- $Y^{91,\,91m}$ 4991, 7077
- $Zn^{65,\,69}$ 406, 2661, 4990, 7871
- Zn^{65} Auger electrons 406
- $Zr^{95,\,97}$ 2657, 3549, 3552, 5000

Beta-ray spectrometers
- use with X-ray absorption energies table in γ-ray energies det. 414
- double focusing, precise γ-ray meas. 1894
  - Siegbahn type 2491
- lens type, pair spectrometer 1899
  - 15 MeV spectrometer 2490
  - long, theory and construction 3352
  - use of caustic props. 4854
- absolute energies det. new method 3353
- standard lines, precision meas. 3564
- method for low-energy spectra 4138
- 180°, arrangement for Compton electron study 4329
- prismatic, focusing validity limits calc. 4852
  - double focusing, with ironless coils 4853
- for double β-coincidence 4855
- survey of techniques 5024
- high-resolution and high-precision spectrometry 5026
- proportional counter type, appl. 5027
- γ-ray energies and conversion lines det. 5036
- JENER, description and performance 5516
- Tricker, with uniform mag. field 5517
- γ-ray investigation by photoelectrons 6209
- semicircular perm.-mag., for conversion line recording 6844–5
- scintillation counters (book) 6884
- line shapes with tilted sources 7721

Beta-rays see also *Electrons*
- β-emissive radioisotopes use to generate high voltages 428
- angular distribution, heavy nuclei 1070
  - and β–γ correl., theory 4314
  - from orientated nuclei, and polarization 5025
  - test of β-interaction theory 7095
- angular correlation, heavy nuclei, β–γ 1071
  - Sb^{124}, β–γ 1074, 8660
  - interference effects 1885
  - Li^8, β–α 3555, 7091
  - β–γ, and ang. distrib., theory 4314
  - external field influence 7092
  - electron-neutrino interference terms 7093
  - Ni^{60} 7096
  - As^{76}, β–γ 7887
  - functions, calc. 8658
- β-recoil study, nuclear processes 1861
  - interpretation 5111
- double β-decay, nuclear stability against 1882
  - search in Sn^{124} and Zr^{96} 5014, 6207
  - search in Te^{130}, Se^{82} 5019
  - search for favourable cases 5683
- from He^6 1922
- β–ν correl., Fermi term 4315
- β-disintegrations, effects of atomic electrons 5017
- accompanied by electron emission from outer ring 5020
- P^{32} disintegration, genuine coincidences 5021
- thickness meas., under 1 mm, appl. 5310
  - nonferromag. layers on nonferromag. support 5311
- Br^{82} 5674

Beta-rays—*contd.*
  - In^{114} 2nd β-transition upper limit 7882
  - K^{40} γ/β ratio 8650
- **absorption** see also *Electrons, absorption*
  - thickness control in paper mill 2683
  - positrons and electrons compared 6089
  - coeffs. in air-equiv. substances, I^{131}, S^{35}, P^{32} 6204
- **effects** see also *Electron beams, effects; Nuclear reactions, electrons; Radiotherapy*
  - atomic excitation in β-decay 1892, 7860
  - betatron irradiation of FeSO$_4$ soln. 5174
- **measurement** see also *Beta-ray spectrometers; Counters; Counter tubes; Dosimetry; Radioactivity measurement*
  - liq. scintillation counter 921
  - β/γ ratio meas., roentgen units 1072
  - latent photog. image intensification 1077
  - β-active particles identification, autoradiographic method 1078
  - 4π counter, absolute counting 3539
    - high-energy β-emitters, abs. calibration 4973
    - low-energy β-emitters, abs. calibration 4974
  - β emitters in soln., immersion counter efficiency 4154
  - abs. counting, thick planar samples 4310
  - low-energy β-particles, proportional counter appl. 5027
  - with counter tubes, review 5534
  - short β-decay lifetime meas. 6195
  - corrosive gases containing P^{32} using end-window counters 6208
  - trochoidal analyser 6838
  - counter tube appl., anal. 6877
  - scintillation counters (book) 6884
  - fluorescent light yield 8340
- **scattering** see also *Electrons, scattering*
  - backscattered, rel. to direction and Z 265
  - back-scattering coeffs. by dielec. charging 6848
  - by electrons, radiative corrections 8223
    - 200–300 keV 8446
  - Schwinger's variational principle appl. 8229

Betatrons see *Particle accelerators*

Bibliographies
  - interference filters, optical 160
  - formic acid thermodynam. props. 199
  - photoconductivity of elements (book) 234
  - elec. breakdown in gases 245
  - recombination of gaseous ions 293
  - surface effects in metals plastic deformation 490
  - fluid dynamics (book) 640
  - turbulence problem 646
  - Bunsen burner 803
  - dielectrics, digest of literature 828
  - fast neutron cross-section meas. methods 1152
  - extension of N.B.S. elect. and mag. units 1737
  - diffraction of e.m. waves by holes 1773
  - imperfections in crystals (book) 2810
  - artificial rain formation 2850
  - conformal mapping, numerical methods 2891
  - guide to tables of probability integral 2900
  - ultrasonic propagation in liquids 3043
  - diatomic molec. spectra, forbidden transitions 3112
  - electron optics (book) 3347, 6836
  - neutron diffraction 3626
  - sintering theory 3627
  - diffusion in metals 3630
  - X-ray crystallographic technology (book) 3735
  - gases in metals 3636
  - oxidation of metals and alloys 3637
  - dislocation theory 3648
  - internal friction in metals 3674
  - nucleation 3714
  - math. tables on punched cards 3787
  - meteoritic dust 3801
  - mass spectrometry (book) 4152
  - high-energy particles (book) 4193
  - e.m. radiation fields (book) 4225
  - Racah and assoc. coeffs., props. 4246
  - nuclear fission 4369
  - rheology of blood 4430
  - atmospheric visibility 4507
  - nuclear props., mesonic interpret. 4610
  - photometry (1925–52) 4682

Bibliographies—*contd.*
  - thermal conductivity of dielectric solids 4757
  - low temp. thermal conductivity, metals 4758
  - ferroelectricity (book) 4785
  - secondary emission multipliers 4860
  - Cherenkov detectors 4882
  - americium 4969
  - low-energy β-particle and allied phenomena, m 5027
  - meson production and scattering 5103
  - nuclear recoil and neutrino detection 5111
  - effective mass and resonant freq., torsional vibrat systems 5332
  - photodisintegrations 5705–6
  - radioactive meas. in geology 5796–7
  - micro-interferometry 5982
  - antiferromagnetism and ferrimagnetism 6131
  - viscous and plastic flow theory 6269
  - photog. emulsions, nuclear appl. 6366
  - information theory 6495
  - counter tube measurements 6877
  - scintillation counters (book) 6884
  - theory of Ising model, ferromagnetism 6933
  - creep and recovery in metals 7221
  - electrochemical theory 7238
  - electrochemistry in biology (1902–52) 7239
  - coloration and luminescence (book) 7295
  - Fourier synthesis of crystals (book) 7319
  - evolution of stars 7385
  - electrical analogues 7474
  - photomultiplier non-linearity 7540
  - flame spectra analysis 7550
  - physics of stationary flames (book) 7627
  - Joshi effect surface layer theories 7699
  - statistical analysis, counter tube meas. 7744
  - special mag. matls., temp. sensitivity 7793
  - electrochemistry of ionic crystals 8063
  - structural materials [illegible] nuclear reactors 8153
  - colour photograph[illegible]oops at [illegible]
  - cosmology 8183 [illegible]n temp. [illegible]
  - fluctuation theory in physical measurements 8199
  - Raman effect in solids 8336
  - low temp. physics (book) 8366
  - semiconductors 8413
  - i.r. photoconductivity 8424
  - electrical discharges 8427
  - cosmic ray particles, unstable 8488
  - collective electron theory of ferromagnetism 8523
  - ferromagnetic materials 8552
  - paramagnetic resonance 8566
  - thermodynam. and kinetic props. of glasses 8710
  - crysts., atomic arrangements and phys. prop 8769

Binary stars
  - spectroscopic, period-density law 1348
  - eclipsing, light-time orbit det. 2153
  - astrophysics symposium (book) 3795
  - components, law of assoc. by magnitudes 6433
  - density distrib. invest. 6434
  - light vel. from, Riemannian space appl. 7419

Biological effects of radiation see also *Radiotherapy*
  - hearing damage risk for steady-state noise 1314
  - new types of ear protectors 1315
  - hearing loss in industry 1316
  - microwave, possible indust. hazards 1317
    - tissue exploration with 15 Mc/s 5813
    - physiol. and patholog. effects 5814
  - ultrasound, thermal effects on blood suspensi 1467
    - on nerve tissue, review 2273
    - temperatures in tissue 2274–5
    - biologic and therapeutic reactions, mech. 2276
    - high-intensity on brain tissue 4521
    - on pepsin proteolytic activity 4522
    - bacterial destruction cavitation effects 5322
    - processing of plasma 8137
  - mice, U pile irrad., lethal components 2105
  - protection by HO$_2$ radicals 2117
  - ultra-violet (book) 2394
    - protective agents on Axolotl cells 6347, 8829
  - bilobed-nuclei lymphocytes in cyclotron person 2868
  - limits of target theory 4523

A complete list of the Subject Headings will be found at the end of the Index.

Biological effects of radiation—*contd.*
- energy absorpt., human tissue, photo-nuclear processes 4524
- X-rays, delayed action 4535
  - soft, on rabbit skin 2860
  - 23 MeV, skin effects 2861
  - on skin, temp. control 8824
- protons on individual cell 8138
- radiations and living cells (book) 8139
- "weather perception" by individuals 8809

Biological technique and instruments
- flying spot microscope 175
- dynamometer for human calf muscles 570
- u.v. television microscopy 787
- electrocardiographic problem, solution 825
- continuously recording radioactive haemoglobinator 1304
- i.r. absorpt. techniques in hypersensitivity disease study 1318
- X-irradiation device, vac. and controlled temp. 2104
- radioactive method for mosquito marking 2106
- all-glass dispersion oxygenator and pump 2107
- multibeam ophthalmoscope for retinal physiol. study 2115
- α-track autoradiographs, improved 2875
- birefringent objects, microscopy 3219
- cytology, phase contrast microscopy appl. 3226
- living objects, phase contrast exam. 3227–8
- high-intensity ultrasound in neurology 4521
- potl. distrib. data, electrocardiography appl. 4782
- portable ear oximeter for man 5263
- oximeter for continuous O saturation meas. 5264
- recording microdensitometer 5371
- micro-respirometer modification for larger animals 6337
- transducer, tape storage tech., heart-beat appl. 6560
- coated wire image transporters 6594
- Mg^{28} as tracer in chlorophyll invest. 7118
- improved historadiographic apparatus 7368
- stomach counter tube for P^{32} 7738
- animal respirator for electrically shielded rooms 8136
- microelectrode-producing instr. 8140
- small vol. change recorder 8248
- electric micro-manipulator 8353
- elec. analogue for compartmental systems anal. 8820
- cuvette densitometer for cardiac output det. 8821
- respirometer for O metabolism rapid changes 8822
- micro electrode for brain pH recording 8823
- control of skin temp. during X-irradiation 8824

Biology see also *Electrobiology; Medical science; Physiology; Zoology*
- electrochemistry in (1902–52) 7239

Biophysics
- electrical phenomena at interfaces (book) 866
- ultrasound action on nerve tissue 2273
- temperature changes in tissue by ultrasonics 2274–5
- of biologic and therapeutic ultrasonic reactions 2276
- u.s. velocity in human and animal tissue 5913
- electrochemistry in biology (1902–52) 7239

Birefringence see *Double refraction*

Bismuth
- vapour, in disch. lamp 176
- film, changes due to electron beam 1974
  - on glass, photoelec. effect 7681
  - structure loosening 8717
- conduction electrons, mean free path 2444
- solid, magnetic susceptibility model 2551
- liquid, neutron diffraction rel. to atomic distrib. 2747
  - X-ray scatt. struct. det. 2757
- single crystals, light-figure invest. 4462
  - preparation from melt 4463
  - spherical, preparation 4464
- low temp. increase elec. resist., rel. to Hall effect 4815
- surface tension at m. pt. 5323
- superconductivity rel. to colour 5478
- optical props. in near i.r. 5967
- elastic wave velocity rel. to temp. 8285
- Bi bolometer, construction and theory 8301
- melting pt. at v. high press. 8358

Bitumen
- high asphaltene content, rheological props. 494
- blown, Weissenberg effect 1197

Blood
- continuously recording radioactive haemoglobinometer 1304
- suspensions, thermal effects of ultrasound 1467
- all-glass dispersion oxygenator and pump 2107
- and its components, acoustic props. 3040
- rheology, survey 4430
- portable ear oximeter for man 5263
- oximeter for continuous O saturation estimation 5264
- dispersion of solute in flowing liquid 6530
- ultrasonic processing of plasma 8137
- cardiac output det., densitometer method 8821

Boiling see also *Distillation*
- film boiling termination mechanism 793
- heat transfer to a boiling liquid 3232

Boiling point
- normal, of O on thermodynam. scale 6002
- CO_2–N_2O mixtures 6715

Bolometers
- general theory of performance 1478
- thermistor, props. 1479
- Bi bolometer, construction and theory 8301

Bonds see also *Molecules*
- C–I, in CH_3I, dissoc. energy 350
- XYH_3 molecules, microwave study 742
- C–Br, organic cpds, dissoc. energies 1000, 8749–50
- H, v. short, O–H stretching frequencies 1010
  - in trifluoro- and trichloracetic acids, spectroscopic study 1509
  - chains and *n*-primary alcohols conductivity 1615
  - effect on OH hindered rotation, alcohols 1826
  - conditions for formation 2035
  - strong, in crystals 2798
  - role in nitric acid structures 2832
  - in pyridine-pyrrole system 3573
  - in boric acid, electron diffract. study 4488
  - nature of H bridge 5183
  - alcohols, rel. to solvent conditions 6629
  - comparison in terms of H partial change 7257
  - bond distances, crystals, D effect 7291
- cyclobutane 1017
- i.r. spectroscopy study 1511
- $C = O$, valence vibration var. in benzophenones 1808
  - stretching freq. study in *o*- and *p*-quinones 2595
- differences, crystall. and amorphous struct. 1955
- polyethylene cross-linking by pile radn. 2022
- geometry, rel. to chem. functions 2034
- metal-to-metal, in cupric and chromous acetate 2086
- carbon-metal, insufficient stability 2797
- "semi-localized orbital" theory 3512
- molec. orbital theory, homonuclear diatom. molec. 4259
- peptide link, NH group out-of-plane deformation freq. 4954
- geometrical classification, infl. of environment 5762
- trimethylaluminium dimer struct., electron deficiency 6301
- energies and distances rel., hydrocarbons 6998
- Hg-C, in alkyl radicals 7262–3
- quantum theory 8036
- bond scattering factors, calc. 8087
- S–O bond length invest. 8112

Bone
- low-angle X-ray diffract. study 4411

Boron
- optical and electrical charac. (book) 234
- electrical and optical props. 1641
- in B steels, neutron irrad. autoradiographic tech. 2129
- semiconductor properties 5468
- $B_{12}Al$, semiconducting behaviour 6774
- reactor neutron distrib. meas. by absorption 7961
- B layer scint. neutron detectors 7963

Boron carbide
- structure investigation 6249
- B_4C semiconducting behaviour 6774

Boron fluoride
- apparatus for filling neutron counter tubes 3379
- BF_3, electron drift velocity 8479

Boron nitride
- electronic band structure 346
- low temp. spec. heat, T^2 dependence 6015
- electrostatic energy 7815

A complete list of the Subject Headings will be found at the end of the Index.

Breakdown, electric see also *Discharges; Electric strength*
    vacuum insulation failure low field strengths 248
    electrode system in vacuum 249, 7697
    dielectrics, survey 828
    between Cu electrodes, 50 c/s, v.l.p., surface treatment effect 883
  gases
    secondary processes active 245
    conference 246
    high-frequency, in Ne 252, 6814
      review 3330
    impulse, theory 1653
    bridging between electrodes, in N discharge 1654
    microwave, d.c. flow 1661–2
    G.M. counters at high overvoltages 2503
    air, with neg. impulses, sphere-plane spark gap 4820
    voltage rel. to contact separations 5486
    voltages, in transverse mag. field, 10 to 10^{-8} mm Hg 5491
    photo-ionization role 6063
    non-uniform fields, l.p. 6066
    formative time lags 6812
      in A, uniform field 7694
    pre-breakdown current study 6813
    comprehensive review 8427
    in crossed electric fields 8434
  liquids
    field emission theory and experiments 3341*
    Hg cathode appl. 6825
  solids
    solid insulators, contrib. to problem 876
    brush discharge ionization density 877
    Fröhlich theory 1619
    directional effects in crystals 4824, 5494, 8438
    high elec. strength dielectrics 5493
    electron avalanche in insulator, high field 6826
    electron multiplication in insulating crystals 8439
Breaking strength see also *Brittleness; Fracture; Mechanical strength*
    Hg in glass, limiting neg. press. 3913
    glass, influence of temp. 1987*
      relation to extent of cracking 7999
      influence of humidity 8000
Bremsstrahlung see also *Electrons, radiation; Gamma rays; X-rays*
    60 MeV electrons in Pb, cross-section 1671
    70 MeV, on Ag and Br, α-ray spectrum 2663
    internal, in P^{32}, Y^{91} and RaE β-decay 2665
      exptl. energy and ang. distrib. 2666
      assoc. with *K*-capture, A^{37} 5001
      of Fe^{55} 5692
      and neutrino mag. moment 6211
      in μ-meson decay 6238
      P^{32}, spectrum 3 to 30 keV 7904
    322 MeV, photoproton prod. 2705
    11 MeV, thick target 3561
    production in electron-electron collisions 3869
    high-energy, polarization 4141
    emission by spin $h/2$ and $nh/2$ particles interaction 4602
    high-freq. end of spectrum, calc. 4858
    differential cross-section rel. to photon polarization 6073–4
    formula for thick target 6851
    flux det., ionization chamber standard 7109
    high-energies, final state electron wave function 7903
Brightness see also *Illumination*
    discrimination data for illum. quantity spec. 2864
    optical meas. method 5937
    comets, absolute 6394
      rel. to solar activity 6396
    extended source meas., radiometer calibration method 6580
    attenuation to very low levels 8303
    of colours, effect of dichroic filters 8349
Brittleness see also *Breaking strength*
    transition from ductility, stochastic theory 1953
Bromine
    low abundance in meteorites 10
    π^--meson activation 1224
    effect on graphite magnetic and conductivity props. 8513
Bromine chloride
    thermodynamic functions 201
Bromine fluoride
    thermodynamic functions 201
    BrF_5 Raman spectrum, struct., force constan
      thermodynam. props. 1551
Bromoform
    molecular structure 367
Brownian movement
    coupled systems 58
    liquid, re-orientation time change, rel. to param
      resonance 325
    elastic spheres suspension, Brownian deformati
      652
    irreversible processes theory appl. 2210
    in liquid transport processes 2239
    Boltzmann and Fokker–Planck equations 2963
    coupled galvanometer system fluctuations 3296
    stochastic process theory 4556
    electrometers 6441–2
    generalization for isolated systems 8243
Bubbles see also *Foams*
    resonance cause of u.s. chem. effects 514
    cavitation, single bubble noise 715
      surface stability 3909
    pulsating, reaction with submerged solid 3033
    sensitive bubble jets 3908
    bubble length method for surface tension 3915*
    bubble method for air diffusion in water 4649
    nonspherical, in liquids, pulsation freq., 5325
    thin film bursting, condensation nucleus data 735
Butadiene
    thermal dimerization 500
    resonance energy 7010
Butane
    n-butane mixt. with *n*-butforane, props. 71
    cyclo-, molecular structure 1017
Butforane
    n-butforane mixt. with *n*-butane, props.71
Cadmium
    vapour, in disch. lamp 176
    superconductivity, size effects 237
      props. below 1°K 864
    Cd($^3P_1$) reaction with propane at low conversion 12
    $Cd_2Nb_2O_7$, ferroelectricity 1611
    crystal growth, oriented 2043
      whiskers, mech. 2045
    single crystals, 'Debye heat wave' dispersion 2063
    anomalous skin effect invest. 2458
    deformed by rolling, X-ray study 2759
    Cd ferrite and Ni–Cd, magnetic behaviour 4206
    thermal cond., low temp., mag. field 6698
    molec. jet, condensation factor rel. to support, e
      7180
    creep at −196°C and 27°C 7220
    film formation, electron microscope study 7972
    elastic wave velocity rel. to temp. 8285
Cadmium borate
    phosphor afterglow 6654
Cadmium fluoride
    single crystal, i.r. transmission limits 3148
Cadmium iodide
    crystal growth, mech. deform. effect 2044
    crystals, growth spirals 4467
Cadmium oxide
    sputtered layers, elec. conductivity and structure 2
    elec. conductivity rel. to temp., 100°–800°K 4802
Cadmium selenide
    needle, field emission current 887
Cadmium sulphide
    elec. strength and conduction current light irra
      effect 876
    needle, field emission current 887
    elec. conductivity accompanying phosphorescen
      1546
    photoconductivity, at absorpt. edge 1547
      high temp. 4811
      polycryst., internal photoelec. effect 5473
      monocrystall., X-ray excited 6053
      variations under X-irradiation 6792
      surface 8425
    luminescence at absorpt. edge 1547
    surface layer noise 4807

Cadmium sulphide—*contd.*
- crystals, growth 5760, 7278
  - differential ionization by α-rays 8480
  - type classification 8758
- aq. solns., electrolysis by a.c. 6289
- elect. conductivity under X- and γ-rays 7668
- film, refract. index, effect of light 8308

Caesium
- monatomic layer effect on thermionic emitter 297
- Cs_2Te photoemission 2460
- Cs_3Sb, electron scatt. effect on photoemission 2461
- Cs–Sb, Cs–In systems, semicond. props. 6042
- $CuCs_2(SO_4)_2$, paramagnetic props., theory 6931
- and CO, heat of reaction 8005

Caesium bromide
- infrared prism 2328

Caesium chloride
- elec. conductivity near thermal transition 1631
- molec. const. by molec. beam elec. reson. 1806

Caesium iodide
- prism, in i.r. spectrometry 3982

Calcite
- cleavage faces behaviour 1161
- calcite-aragonite system phase equilib. 8007

Calcium
- vapour, in disch. lamp 176
- Hall coefficient 4235
- ferrite, self-diffusion 4402
- titanate, elec. conductivity 6771
- indirect polarographic 8756

Calcium carbonate see also *Aragonite; Calcite; Chalk*
- and phosphates, spectrochem. estimation 7268

Calcium fluoride see *Fluorite*
- transparency rel. to temp., Schumann region 140
- phys. props. compared with BaF_2 489
- elastic wave propagating charac. at 15 Mc/s 687

Calcium phosphate see *Apatite*

Calcium sulphate
- anhydrate, thermobalance and i.r. absorpt. study 7567

Calculating apparatus see also *Fourier analysis; X-ray crystallography, analytical apparatus*
- **analogue apparatus** see also *Nomograms*
  - correlation fn. computer 5
  - photomech. analyser for transient waveforms 84, 8177
  - transformation of photometric meas. to blackening 102
  - book notice 577
  - computers for coordinate transformation 1333
  - Eller's optical molec. electron diffract. study appl. 1825
  - extrapolation techniques in elec. network solns. 2138
  - traffic dynamics anal. appl. 2893
  - unit for nonlinear differential eq. 2898
  - elec. computer for linear simultaneous eq. 2899
  - computer using Kelvin bridge principle 3790
  - high-speed product integrator 3791
  - Fourier analyser 3792
  - tissue dose computer for rotational therapy 4537
  - Fourier series, mechanical synthesizer 6374
  - Fourier analysis, simple rotating device 6375
  - membrane app. for analogic soap-film solns, partial-diffl. eq. 6381
  - mech. harmonic synthesizer, circuit anal. appl. 6382
  - electronic complex plane scanner 6383
  - recorder-playback, for crystal anal. 7315
  - electrical analogues, survey 7474
  - rule with scales for vector triangle soln. 8178
  - sampling type integrators 8179
  - optical, for Fourier series in crystal anal. 8091
- **differential analysers**
  - electronic, for teaching 2137
  - EDSAC appl. to crystal structure analysis 7314
  - photomech. wave analyser for Fourier anal. 8177
- **digital computers**
  - flying spot microscope appl. 175
  - organization of calculations (books) 576, 2139
    - programming to learn 1332
    - programming to play chess 6380
    - micro-programming, and control circuit design 7376
  - decision elements 2140–1

Calculating apparatus—*contd.*
- **digital computers**—*contd.*
  - DINA, analyser for Laplace etc. eq. 2142
  - large scale computing appl. in physics 2897
  - uses as research tool 3789
  - appl. to microwave spectroscopy calc. 3997
  - magnetic storage units, short call-up times 5831
  - eq. of state calc. method for fast machines 6026
  - punched-card, colour difference calc. appl. 6682
  - in atomic theory, symposium 7025
  - mechanical multipliers for indirect meas. 7412
  - high-speed, 3-dimensional Fourier summations appl. 8789

Calculation see also *Graphs; Nomograms*
- numerical analysis (book) 576
- certain phys. quantities, symmetrical domains appl. 1330
- of metallurgical furnaces charges 2118
- elec. network analogue solns., extrapolation techniques 2138
- appl. of conformal maps 2891
- large scale computing appl. 2897
- boundary-value problems, Chebyshev-polynomial operators appl. 3784
- eigenvalues of Hermitian operators 5267
- of graphical square intercomparisons, accuracy 5830
- principles for interconnecting physical system solns. 7374

Calculus see also *Differential equations; Integrals*
- of quantized operator 2942
- operator, in quantized field theory 2943
- of measures, e.m. unit systems appl. 3846
- **variational**
  - reflection coeffs. det. appl. 4038
  - luminous trajectories appl. 4684

Calorimetry see also *Heat of adsorption, etc.; Specific heat*
- heats of transformation meas. 195
- spec. ht. det., compressed CO_2, const. vol. 2426
- heat evolution in cold-worked metal recovery 3660
- 4-element micro-calorimeter in thermo-gravimetric meas. 4770
- microwave, theory and appl. 4936
- luminescent powder quantum efficiency det. 6655
- liq. flow calorimeter for stationary heat flow 6735
- photon flux det., 150–300 MeV 7109
- γ-ray actinometers, calorimetric calibration 7253
- low temp., apparatus for 8367
- units, committee report 8383

Cameras
- testing with variable focal length collimator 574
- multi-flash, development for liquid jets study 1325
- for fine focus X-ray tube 2064
- fast spectrographic camera design 5946
- multiple spark, physics appl. 6371
- stereoscopic, for Wilson cloud chamber 7371
- for colour photography, review 8172

Camphor
- *d*-camphor dielectric relaxation 211

Capillarity see also *Bubbles; Contact angle; Drops; Films, liquid; Foams; Surface tension*
- pore-size distrib. determination method 1173
- spreading of liquid metals on solid surfaces 6526
- flow meas. of particles in suspension 8629

Carbon see also *Diamonds; Graphite*
- radiocarbon dating, automatic counter appl. 926
  - Lamont measurements 1046
  - proportional counter appl. 1048
  - book 1276
  - sample prep. and counting tech. 2646, 3538
  - review 2839
  - new counter technique 3764
  - meas. as CO_2, in gas counters 6878
- av. multiplicity, penetrating particles, cosmic ray showers 943
- solubility and diffusion coeff. in Ni 1174
- estimation in steel using artificial radioactivity 1234
- cokes, X-ray scatt. invest. 1970
- steam-carbon reactions, effect of specific catalysts 2008
- solid fuel particles, combustion rates 2408
- C^{14} sample prep. and counting technique 2646, 3538, 3764, 6878

A complete list of the Subject Headings will be found at the end of the Index.

Carbon—*contd.*
  effect on steel spectral intensity 2802
  electrodes, vac. spark emission charac. 3096
  heat of vaporization study 3275
  isotopic ratios from mass spectra of $C(CH_3)_4$ 3393
  coking coals, plastic props. 3654
  spectral emissivity 5370
  triplet splitting calc. 5661
  double-replica method using C layers 5732
  thin layer, refract. index meas. 6668
  molec. species evaporating from C surface 7644
  structure of lustrous layers 8713
Carbon dioxide
  Maxwell reflection coeff. det. 81
  CO_2–CO_2 and CO_2–N_2O, intermolec. potentials 349
  emissivity at high pressures 722
  optical anisotropy, modified Silberstein model 1820
  3rd virial coeff. 2259
  compressed, spec. ht., const. vol., det. 2426
  sound vel., shock tube meas. 3943
  spec. heat ratio, resonance method 4774
  proton energy losses 4874
  energy per ion pair 4885
  flow in tube near critical point, expts. 6535
  meas. of Joule–Thomson coeff. 6550
  CO_2–N_2O critical constants 6715
  kinetic energy at crit. point 8365
Carbon disulphide
  optical anisotropy, modified Silberstein model 1820
  self-diffusion, pressure effect 2248
  mag. rotatory power rel. to temp. and phys. state 4937
Carbon monoxide
  flame propagation 185
  explosions, effect of water vapour 1208
  CO–steam reaction catalysis, metallic impurities effect 2009
  3rd virial coeff. 2259
  thermodynam.-props. 0 to 150°C, up to 3000 atm. 2428
  ion drift velocities 2514
  identification in atmosphere 4497
  abundance var. in atm., solar spectrum data 4569
  intermol. force constants 5618
  and Cs, heat of reaction 8005
Carbon tetrachloride
  vapour, refractivity 726
  proton energy losses 4874
  CCl_4–SnI_4 diffusion, press. effect 7495
  Rayleigh's ratio, value and det. 7614
Carborundum
  corrosion figures, dislocation interpret. 7286
Cartography see *Photogrammetry*
Catalysis see also *Reaction kinetics*
  heterogeneous, promotion in 507–8
  inorg.-free radicals reactions in soln. 1204
  steam–carbon reactions, electronic theory 2008
  CO-steam reaction, metallic impurities effect 2009
  on evap. metal films, CH_4 and D reaction 5159
  invest. by thermoluminescence, review 5415
  isotopic exchange between O and water 7057
  Fe catalysed sulphonates reaction 7237
Catalysts
  Ni, activity promotion by CeO 507–8
  Mn O compds. props., rel. to phys. and chem. charac. 1218
  effect of Fe, Na, Ca, Al on steam–carbon reactions 2008
  porous, diffusion in 3014
  Rh, Pt, Pd, W films, efficiency for CH_4 and D reaction 5159
  oxidic, electronic disorder effect on N_2O decomp. 6285
  Cr_2O_3–Al_2O_3, electrical properties 8412
Cataphoresis see *Electrophoresis*
Cathode ray tubes see *Electron tubes*
Cathode rays see *Electron beams*
Cathodes see also *Electron emission; Thermionic emission*
  BaS properties 294
  new dispenser type 3400
  metal capillary cathodes 6909
  coeff. of disint. in elect. arc 7696
  surface effect in glow to arc transition 8437
Cathodes—*contd.*
 oxide
  elec. props. theory 222
  BaSrCaO, low temp. conduction mech. 295
  bariated W emitters 296
  (Ba, Sr)O, present knowledge 297, 4181
   excess thermal noise 1711
  effects of O 938, 4892
  temp. meas., electrical method 940
  BaO, cathodoluminescent spectrum rel. to thermio activity 1548
  oxide-coated W, factors affecting emission 2519
  BaO activation, photocond. study 3397
  contaminated anode emission decay phenom 3399*
  conductivity meas., retarding potl. method 4180
  thoria, thermionic props. 4888–9, 7751
   experimental study and theory 5545
  electrons, vel. distrib. with pulsed operation 4890
  with resistive interfaces 4891
  Ni, interface impedance meas. 5546
  thermionic emission rel. to elec. conductivity 690
  l.f. fluctuations temp. dependence 6908
  base alloy, double activators 6910
  Ba diffusion study 7748
  chemistry, theoretical study 7749
  hollow, diode charac. 8475
Cavitation see also *Vortices*
  in He II 190
  due to vertical entry of missiles 647
  bubble, noise due to 715
   surface stability 3909
  small transient cavities, dynamics 1412
  by u.s. waves, bacterial destruction study 5322
   step-by-step process 5886
   role in chem. effect 5923
Cavity resonators see *Electromagnetic oscillatio Resonators, acoustic*
Cellulose
  regenerated, thin films, bonding to solid surfaces
  fibril diameters, elec. micr. and X-ray difference 5
  low-angle X-ray scatt. study 5729
Centrifuges
  ultracentrifuge rotor temp. meas. and control 81
  ultracentrifuge cell for synthetic boundary p duction 2790
  ultracentrifuge design and appl., review 4627
  high-speed, use in isotope enrichment 7852
Ceramics
  as insulators, survey 828
  $BaTiO_3$, containing $CaTiO_3$, Y_2O_3, $PbTiO_3$, proved temp. stability 832
  ferromagnetic, preferred orientation effect on m props. 961–2
  ferroelectric, elec. props. near Curie point 6758
  antiferroelec. $PbHfO_3$ phase transitions 7656
  TiO_2 semiconductors, elec. props. 8414
  ferromagnetic, recent developments 8552
  as refractories for nuclear reactors 8693
Cerium
  elec. resistivity, low temp. 840
   rel. to mag. field 4108
  Ce ethyl sulphate, magnetic props. 2545, 7797
  nitride, powder, supercond. invest. 4107
  paramag. reson. absorpt. 5568
  thermal cond., low temp., mag. field 6698
  $Ce_2Mg_3(NO_3)_{12}$, mag. dipole interactions, rel. entropy and susceptibility 6931
   mag. props. and spec. ht., 1°K to 42°K 7630
   entropy below 1°K 7631
Chalk
  luminescence 3151
Change of state see *Phase transformations; Ther transformations*
Charge see *Electric charge*
Chemical analysis see also *Spectrochemical analysis*
  O_3, electrometric, at high diln. 1233
  gas, by acoustic oscillations energy meas. 2038
  differential thermal, quantitative interpret. 2039
  u.v. papyrography 2040
  transference nos., moving boundary method 2801
  trace, by effect on heated Pt condensation nu prod. 3776

Chemical analysis—*contd.*

- fluorimetric, of U in ores 4460
- by thermoluminescence, review 5415
- minerals, estimation by diffraction in elect. microscope 5735
- low conc. H in N, meas. 7266
- Sm in presence of Nd, by crystallization in mag. field 7269
- **adsorption** see *Chromatography*
- **polarographic**
  - c.r. oscilloscopic invest. of Hg electrodes phenomena 526
  - "tensammetry," surface phenomena a.c. invest. 527
- **positive rays** see also *Mass spectrometers, applications*
  - D_2O concentration in water 5189
- **radioactive**
  - Th and products, time variations 393
  - N as impurity throughout metal sample, invest. 483
  - U-containing mineral "chemical" age det., RaD method 1047
  - C estimation in steel 1234
  - electron radiography and autoradiography 1859, 6192, 8163
  - pegmatite U content 2641
  - mixed radioisotopes assay 2644
  - Ta, in its ores, assay 2645
  - induced radioactivity method, scope 4459
  - U and Th det. in ores 5787
  - det. of traces of Io in deep-sea sediments 5795
  - Ta estimation in niobium minerals 7267
- **X-ray** see also *X-ray examination*
  - steels, by X-ray fluorescence, problems 528
  - conference report 1253
  - fluorescence X-rays in metallurgical analysis 2126
  - quartz quant. det., X-ray diffract. 4461
  - X-ray microanalyser camera 5186
  - $NaCl–SiO_2$ mixtures, by powder diffract. line intensities 5188
  - use of Be window low-voltage tubes 5511

Chemical effects of radiations see also *Nuclear reactions, chemical effects; Photochemistry*

- **acoustic waves**
  - O formation in aq. liq. and CCl_4 soln. bond fission, explanation 514
  - KI oxidation by ultrasonics, rel. to wavelength 2018
  - u.v. emission from water due to ultrasonics 2267
  - hydrolysis of ethyl acetate 5746
  - oxidation by u.s., O acceptor inhibiting action 5761
  - u.s. influence on steel dissolution in H_2SO_4 5766
  - sonochemistry, u.s. waves, mech. 5923
  - oxidation of N_2 in dissolved air by ultrasonics 8029
- **ionizing radiations**
  - radiation decomposition of organic molecules 516
  - X-rays, on aq. soln. perchloric acid 1221
  - Co^{60} γ-radiation on aq. benzene solutions 1222
  - cross-linking of polyethylene by pile radn. 2022, 7211
  - butter-fat, high-energy electron irrad., after-effect 2023
  - on linear high polymers 2024
  - γ-rays dosimetry in presence of slow neutrons 2025
  - protection by HO_2 radicals 2117
  - u.v. light from arc, nucleus formn. 2512
  - high-energy, on long-chain polymers 2789
  - action of X-rays on NH_3 solution 3687
  - X-rays, hard, H_2 yield with water 3688
  - H_2O_2 formation by Co γ-radiation 3689
  - H_2O_2 formation at fresh metal surfaces 3690
  - radn. induced in thin films by α-radn. 4449
  - nitrate crystals, decomposition 4450
  - $KMnO_4$ changes under electron bombard., rel. to thermal decomp. 5137
  - $KClO_4$ decomp. by X-rays 5172
  - Br substitution reactions neutron-capture activated 5173
  - betatron irradiation of ferrous sulphate solutions 5174
  - Fe and Ce dosimetry at high rates 5758
  - ceric salts reduction and ferrous sulphate oxidation by Po α-particles 5759
  - ferric ion reduction by γ-radn. 5760
  - water radiolysis, track effects 6298
  - γ-ray actinometers, calorimetric calibration 7253
  - electrons of high energy on polymers 7254

Chemical effects of radiations—*contd.*

- **ionizing radiations**—*contd.*
  - polymer degradation by γ-rays and neutrons 8025
  - methanol–C^{14} decomp. by own radiation 8026
  - acrylonitrile γ-induced polymerization 8027
  - ferrous sulphate oxidation in H_2SO_4 by radon radn. 8028
  - ferrous, ceric, and methylene-blue dosimeters 8649
  - AgBr in electron microscope 8716
  - initiation of explosions, size effects 8735
  - spatial distrib. of free radicals formed 8739
  - pile radiation on poly Me methacrylate 8740
  - hard X-rays on KI, I_2 prod. 8741
  - protons, H_2O_2 formation in water 8742
  - Fe^{2+} oxidation, pile radiations diff. 8743
  - polyethylene, by neutrons and γ-rays 8751

Chemical reactions see also *Heat of formation; Heat of reaction; Oxidation; Photochemistry; Polymerization; Reaction kinetics*

- in sputtered CdO layers 224
- molecular orbital theory of aromatic hydrocarbons reactivity 361
- induction period in chain reactions 499
- dental amalgams setting process 549
- fluid mixtures, thermal transfer theory 794
- rel. between reactivity and molec. struct. 995
- oxyanion, with bases, mech. 1201
- methyl and *t*-butoxy radicals with acetaldehyde and acrolein 1202
- acetyl radical stability 1203
- inorg. free radicals in soln., thermodynam. 1204
- saponification, isotope effect, nuclear substituents influence 1205
- $Hg(^3P_1)$ with ethylene 1210
- $Cd(^3P_1)$ with propane at low conversion 1211
- $CoCl_2.6H_2O$ thermal decomp., electron diffract. exam. 1232
- malonic and chromomalonic acid decarboxylation, intramolec. C isotope effects 2002
- $Fe–C–H_2$, method of invest. 2776
- higher Fe carbides, thermal reactions 2777
- free radical, entropy changes 2778
- transition element organic compds., difficult prep. 2797
- CO/O explosions, spectral and press. observations 3152
- caused by electron excitation in glow discharges 3334
- unsat. hydrocarbons reactivity, free-electron model 3503
- alkyl bromides, unimolec. decompositions 3676
- nitromethane thermal decomp. 3678
- in solid state, i.r. absorpt. spectra study 3679
- ketones, pyrogenetic formation 4437
- cyclobutene-d_6 and cyclobutane-d_8, synthesis 4438
- $C_2H_4 + HX = C_2H_5X_1(X = Cl \text{ or } Br)$, equilibria 4439
- involving polyatomic intermed. complexes, adiabatic correl. rules 4440
- temp. grad. effect on matter distrib. and transport phenomena 4645
- thermodynamics, appl. (book) 4777
- irreversible processes, thermodynam. theory 5149–50
- in solution, thermodynam. theory 5151
- CH_4 and D, metal film catalysts 5159
- methyl radicals with acetaldehyde, Arrhenius plot 5167–8
- ionic hydration and Stokes' law 5184
- electronic struct. dependence, steric effect influence 5622
- NO decomposition, spectrographic absorpt. study 5742
- methyl linolenate, autoxidation initiation process 5965
- methyl radicals, with H isotopes 6280
- unimolecular, mechanism 6281
- solid phase, in $CaO–SiO_2$ system, thermodynamics 6282
- effect on gaseous flow 6544
- ether decompositions, theory 7230
- carbiding of Fe, C^{14}-labelled CO study 7231
- I, chem. behaviour at low conc. 7232
- OH, CH, HCO formation in flame 7233
- surface, of O and C on W, field emission study 7256
- acetone pyrolysis, mech. 7264

A complete list of the Subject Headings will be found at the end of the Index.

Chemical reactions—*contd.*
- atoms and free radicals, mass spectrom. detect., HO_2 search 7629
- oxide cathode chemistry 7749
- precipitation processes study, replica tech. 7983
- toluene bromination, bond dissoc. energies 8024
- tarnishing, linear film growth 8049
- NO–N_2O_5, new data 8732
- NO_2–C_2H_5OH, i.r. spectrom. study 8733
- O and H sorption by Ni films, mech. 8747
- CO_2–H_2O mixtures in h.f. arc 8755

Chemical structure see also *Bonds*
- molecules, rel. to radioactive props. of nuclei 1863
- F^{19} nuclear magnetic screening in benzene compounds 3699
- molecular orbital theory, organic 3701
- molecular orbital theory (review) 3702
- H bonds in boric acid, elec. diff. 4488
- geom. classification of bonds and groups 5762
- nature of Hg–C bonds in alkyl radicals 7262–3
- amorphous long-chain polymers, eqn. of state 8751
- **magnetic effects** see also *Magnetochemistry*
  - polyacenes, diamag. anisotropy 326
  - peroxides, molar susceptibilities 522
  - 4-ring condensed aromatic hydrocarbons, diamag. anisotropy 1754
  - Na plutonyl acetate, magnetochemistry 3437
  - suscept. of NO and O in clathrate cpds. 3438
  - *o*-, *m*- and *p*-nitroanilines, susceptibility measurements 7261
- **magneto-optical effects**
  - ethane and saturated hydrocarbons, rotativities 1231
- **mechanical effects**
  - polymer phys. props. rel. to cross-linking 2022
  - Polythene, effect of cross-linking 4455
- **optical effects**
  - modified Silberstein model, optical anisotropy 1820
  - Raman intensity rel. 4732
  - NH out-of-plane deformation freq. in peptide link 4954
  - 25 years retrospect of Raman effect 5411
  - chemical modulation of transmitted light, transient molecules 5765
- **thermal effects**
  - Polythene, cross-linking effect on melting 4455
  - Polythenes, fusion temp. 7260

Chemical technology
- transfer of heat and mass (book) 797
- optics in the oil industry 1320
- ultrasonic emulsification of flotation reagents 3957

Cherenkov radiation see also *Electrons, radiation*
- simple account and considerations 268
- fast coincidences with Cherenkov counters 282
- rel. to luminescence of radioact. isotopes solns. 769
- β- and γ-induced, in water 1683
- ionization loss at relativistic energies 2492
- in radioact. isotope aq. soln. luminescence 3173
- and energy loss, relativistic ionizing particle 4142–3, 6850
- in a dispersive medium 4144
- from cosmic rays, night-sky light due to 4513, 8132
- Cherenkov detectors 4882
- polarization effects on emission rate 8451
- counter meas. rel. to refractive index 8471
- cosmic ray, intensity meas. 8504

Chlorine
- optical anisotropy, modified Silberstein model 1820
- liquid, atomic distrib. curve study 3921
- vibrational transitions in collision 5611

Chlorine fluoride
- thermodynamic functions 201
- ClF_3, thermodynamic properties 203

Chlorine oxide
- ClO_2, vibration potential function 1810

Chromatography see also *Adsorption*
- deep bed performance isotherms, ion exchange mech. 2000
- u.v. papyrography appl. 2040
- Fr chromatographic separation 5190
- paper, AcB sep. from AcC″ 7270

Chromium
- thermionic constants 937, 2516
- effect on steel spectral intensity 2802

Chromium—*contd.*
- thick film, reflectivity and optical const. 4737
- paramag. reson. absorpt. 5568
- magnetic struct., neutron diffract. study 8525
- Cr^{+++} magnetization studies, low temp. 8560

Chromium alum
- crystalline field, mag. props. appl. 969
- paramagnetic, low temps., Cr^{+++} props. 971
- phys. props. at low temps. 1573
- CrK alum, adiabatic demagnetization results 15
- CrK alum paramag. relaxation 2542
- $CH_3NH_3.Cr(SO_4)_2.12\ H_2O$, adiabatic demagne tion 6949
- CrK alum in adiabatic demag. refrigerator 8377
- paramag. res. spectra 8557

Chromium oxides
- Cr_2O_3, antiferromagnetic struct. 6136
  - antiferromag. reson. 8541

Cinematography see also *Cameras*
- nonintermittent, rotating-prism compensator ab tions reduction 1486*
- colour, rel. to human eye sensitivity 2889
- **high-speed** see also *Photography, high-speed*
  - technique for under-water explosions study 1324
  - multi-flash camera, liquid jets study appl. 1325
  - electro-optical effect shutters 2133
  - app. for recording images 2134
  - synchronized flash-discharge system 2888
  - Schlieren, flame propagation 6716

Clay
- minerals, exchange adsorpt. thermodynamics 44
- tagged (radioactive) spherical particles prep. 50

Climatology
- changes in Australia (since 1880) 6331

Cloud chambers see also *Counters*
- diffusion type, theory and charac. 286
  - thermocouple temperatures 931
  - pion interaction study in H and He 7175
  - downward design and operation 7745
- emulsion, cosmic rays high-energy interactions 311
- cosmic-ray photographs (book) 1717
- graphical analysis of photographs 2507
- simple diaphragm type, counter-controlled 3383
- continuously sensitive type 3384, 6115, 7746
- momentum determinations with axially symm. fields 4170
- multiple scatt. theory appl. 4884
- cosmic-ray heavy charged unstable particle study
- angular scattering of light by single droplets 667
- flash tube for illuminating 6690
- Wilson, stereoscopic cameras appl. 7371
- electron specific probable ionization study 7727
- with magnetic field 8474
- for electron showers in dense materials 8491

Clouds
- drop growth by condensation 566–7
- radar observations, conference 2094
  - graupel layer-growth 4502
  - precipitation growth observation 4503
  - non-freezing, study of rain 4505
- artificial rain formation, review 2850
- droplet sampler for aircraft 4496
- stratiform, precipitation growth rate 4503
  - rain prod. by coalescence 4504
- surface tension of drops 5892
- above freezing level, charged drop develop. 736

Cobalt
- thermionic constants 937, 2516
- Co disilicide superconducting props. 2467
- transformation, macroscopic shear 2755
- elec. resist. rel. to mag. field 4108
- X-radiation protection, mech. 4534
- phase trans. in single crystals 4764
- polarization of nucleus 5653
- thermal cond., low temp., mag. field 6698
- fine particles, coercive force 8543
- Hall effect, theory 8599
- martensitic transformation 8765

Cobalt chloride
- $CoCl_2.6H_2O$, electron diffract. exam., beam c effect 1232
- magnetic susc., and solid solutions 5565

A complete list of the Subject Headings will be found at the end of the Index.

obalt ferrite
- spontaneous magnetization 958
- magnetic behaviour 1746
- single crystal, magnetostriction 1795
- microwave dielec. const. and permeability 4079
- l.f. dispersion 4081
- anomalous resonance absorption 4211
- Co–Zn, anomalous reson. absorpt. 4211
  - ferromag. reson. 4214

obalt fluoride
- CoF$_2$, neutron diffract. antiferromag. study 6132
- magnetic anisotropy 8546

obalt oxide
- antiferromagnetic resonance 8541
- antiferromagnet, magnetomech. effects 8569
- Fe and Co mixed oxides, magnetization study 8574
  - magnetostriction, X-ray det. 8603

old working see also *Plastic deformation; Slip; Work hardening*
- Pt, elec. resistance increase 243
- new effect on powder X-ray patterns 485
- X-ray reflections broadening by stacking faults 486
- brass, neutron diffraction studies 1269
- effect on resistivity, temp. dependence 1648
- drawing synthetic fibres 1958
- Cu, low-temp. studies 1992
  - internal friction and Young's modulus rel. to strain 7216
  - effect on Young's modulus 7987
- lattice deformation in Al 2076
- rolled polycrystall. metals, X-ray microbeam exam. 2758
- Sn, Zn, Pb, Cd, X-ray exam. 2759
- in thoriated W, X-ray study 2770
- dislocation theory, review 3648
- heat evolution during recovery, meas. 3660
- effect on face-centred metals resist. 4109
- effect on elec. props., metals 4110
- effect on Ni sheet mag. props. 4216
- wires, Matthiessen's rule validity 4422
- small-angle X-ray scatt. calc. 6251
- α-brass, stacking faults meas. 7215
  - effect on elec. resist. 7667

ollections of physical data Only comprehensive works of reference are listed here
- Lennard–Jones and Devonshire eq. of state, tables 200
- Li-containing phosphors, u.v. and α-particles response, table 281
- critical X-ray absorption energies 414
- thermal neutron capture cross-sections 458
- sensitive lines, wavelength tables 1235
- star colour temperatures 1344
- nuclear shell structure tables 1831
- CO thermodynam. props., 0 to 150°c, up to 3000 atm. 2428
- light nuclei energy levels 2604
- scatt. amplitudes and cross-sections, neutron diffract. crystall. 3626
- characteristic wavelengths of diatomic band spectra 3992
- Racah and assoc. coeffs., props. 4246
- abs. brightness of comets 6394
- critical properties of elements and compounds 6714
- complete table of isotopes and properties 7061
- X-ray crystall., international tables (book) 7299, 8064
- current density tables for field emission 7711

ollision processes see also *Ionization; Nuclear forces; Nuclear reactions; Scattering, particles*
- electron/atom, inelastic, strong coupling 383
- electrons, with atoms and molec., energy losses 900
  - and conduction current in ionized gas 8478
- pairs of particles, ang. distrib. formula 1100
- between spin $\hbar/2$ particles, pair creation 1383
- bound states in weak interaction 1389
- resonance electron capture from H by protons 1904
- spin $n\hbar/2$ and $m\hbar/2$ particles, Coulomb scatt. 2194
- Born approx., validity in stripping 2199
- collision damping effect on electron gas polarization 2429

Collision processes—*contd.*
- nucleon-nucleon collisions, multiple meson prod. 2735–6
  - energy calc. 4336
  - heavy meson production 6239
  - "jets" in emulsions 7120
- electron scattering by He ions, variational method appl. 3359
- proton/proton, π^+ meson prod. 3614
- electron-electron, bremsstrahlung prod. 3869
- heavy particles, loss, radiative correction 3870
  - pair formation theory 8670
- particle ensemble statist. density 4598
- resonance excitation in Hg vapour by light 4678
- variational methods appl. 5288
- F$_2$O excitation by Ne, calc. 5612
- collisions theory, variational methods 6474
- energy loss of charged particles of intermediate energies 6860
- algorithm of Dirac spurs 7442
- nucleon collisions, Fermi's theory, and pion zero-point energy 7169
- Born–Oppenheimer approximation 7454

gases
- binary, influence on molecular flow 80–2
- in He h.f. discharges, similarity appl. 1655
- inelastic, molecular, energy transfer 3029
- role in activational processes 3681
- neg. ion formation, polyatomic molecular gases 4176
- inelastic, between atoms 4177
- resonance excitation in Hg vapour by light 4678
- exchange between energy modes of molecule 5610
- ditto, calc. for Cl$_2$ 5611
- atomic, in Hg afterglows 6067
- conduction current in ionized gas 8478

Colloids see also *Electrophoresis; Emulsions; Gels; Sols; Thixotropy*
- BaSO$_4$, micro-spherical aggregation 517
- interaction force between particles 2026
- particle swelling during sol-gel transition 2027
- phys. chem. treatise (book) 5147
- double layer, free energy and charging process 5161–2
  - modified Poisson–Boltzmann eq. 5163
- ultrasonic vibration potentials 5748
- ζ-potential TiO$_2$ sol in presence of electrolytes 6811
- Brownian motion of free particle, Onsager's rel. appl. 8243
- KH$_2$PO$_4$ cryst., ferro-electric props. 8387

Colorimeters
- automatic, photoelectric 4046

Colorimetry see also *Spectrochemical analysis; Spectrophotometry*
- dye control with *R*-Cam and ruler 169, 3196
- precision colour temp. meter 723
- light sources, colour props. 785
  - C.I.E., *A*, *B* and *C*, spectral energy distrib. 3197
  - white light standard 3964
- of bronze paints 1564
- Macbeth illuminometer, colour matching filters 2307
- text-book 2393
- C.I.E. and Munsell 3-dimens. colour models 2395
- Munsell repaints, specifications 3195
- standard observer data of 4358 Å 4749
- MacAdam and Adams–Nickerson colour difference indices, comparison 5986
- spectrophotometric, error propagation 5988
- fluoresc. lamps, colour-rendering props., specification 6679
- colour equations, additivity 6680
- subtractive method with Pulfrich photometer 6681
- colour differences, automatic calc. 6682
- size of acceptable colour differences 6683
- truncated weighted ordinate integrations 6684
- use of interference filters 8327
- additive mixture, 2 colours, graphical method 8348

Colour see also *Photography, colour*
- colour rendering, television invest. 170
- ZnO, charge with temp. 758
- and lighting, colour adaptation study 786
- reproduction, correction by masks 1326
- text-book 2393
- CIE and Munsell 3-dimens. colour models 2395
- Munsell repaints, specifications 3195

- **Colour**—*contd.*
  - fluorescent lamps colour-rendering props. 5430
  - colour-mixture functions, dependence on primaries 5987
  - effect of dichroic filters on colour contrast 8349
  - in landscapes, rel. to atmospheric light 8350
  - theory
    - text-book 2393
- **Colour centres**
  - alkali halides, *F*- and *V*-bands enhancement in NaCl containing Ca 128
    - iodides, *β*-band absorption, photoelec. emission 232
    - additively coloured, paramag. reson. absorpt. 323
    - *F*-centres formation during irradiation 1250
    - effect of X-irradiation at 5°K 1251
    - generated in NaCl by electrolysis 2061
    - *F*-centre wave functions and *g*-values, KCl 2546
    - mixed cyrstals, *F*-bands 2812
    - absorpt. band maxima, latt. param. correl. 3721
    - NaCl containing centres and precursors, free Na presence 3727
    - NaCl and KCl *F*-centre energy levels calc. 4477
    - trapped charge, in KCl, KBr 4478
    - KCl, magnetic susceptibility excess 4903
    - low temp. generation 5170–1
    - KCl density, colour centres effect 6308
    - discoloration by cathode rays 6311
    - KBr, X-ray coloration invest. 6651
    - NH_4 halide coloration 8322
    - additively coloured, photocurrent 8397
    - NaCl, mobility of electrons from *F* centres 8600
    - KCl, KBr mixed crystals, visible region 8775
    - mixed, *F*-band position 8776
    - mixed, *V*-bands in KCl–KBr 8778
  - trapped exciton study in K azide 2001
  - in diamonds 2062
  - glass coloration by high-energy radn. 2638
  - *F*-centres, effect on rock salt internal friction 3725
  - corundum, X-ray coloration saturation 3726
  - F-centre energy levels calc. 4477
  - alk. earth halide crystals, spectral location of absorption 5399
  - crystal density decrease due to 6308
  - LiF, irradiated, spectral phenomena 6646
  - S^- *F*-centre formation in latent image theory 6943
  - coloration and luminescence (book) 7295
  - MgO u.v. coloration, rel. to photocond. 7682
  - CaF_2, equivalent to alkali halide *F*-centres 8777
- **Colour vision**
  - colour rendering, subjective aspects 170
  - iso-chromaticity lines in colour-deficient vision, det. 572
  - colour adaptation 786
  - colour discrimination, field size and surroundings effects 1307
  - spectrum tristimulus values for Egyptian and British 1308
  - testing with pseudo-isochromatic plates, illumination effect 2108
  - physiological and psycho-physical aspects (book) 2393
  - photopic thresholds for red light 2863
  - retinal receptors, a.c. method isolation, polychromatic theory 4528
  - crystalline state of red-absorbing pigments in eye 4532
  - perception in 1° fields 5817
  - spectral sensitivity of fovea 5818
  - foveal luminosity function rel. to chromatic adaptation 8144
- **Columbium** see *Niobium*
- **Combustion** see also *Explosions; Flames; Reaction kinetics*
  - gas, by elec. spark, Schlieren study 186
  - slow, of cyclopropane 502
  - Bunsen burner, review 803
  - burning gas efflux, sonic rel. transition 1433
  - rel. det. by phase-contrast photography 1583
  - di*iso*propyl ether ignition inhibition by Pb compds. 2004
  - rates, for solid fuel particles 2408
  - acetylene, explosive, kinetic spectroscopy 3246
- **Combustion**—*contd.*
  - ethylene oxide, velocity 3247
  - wood ignition by radiation 3249
  - slow, of *cyclo*propane, general kinetics 3680
  - wave governed by 1st-order reaction, theoret. m 4441
  - rel. to stellar spectra 6436
  - burning velocity, high-speed photog. meas. 6716
  - combustion wave instability, slot burner study 6
  - hydrocarbon, chemiluminescent phenomena 834
- **Comets** see also *Astronomical spectra*
  - physics of, colloquium 6392
  - photographic photometry 6393
  - brightness, absolute meas. 6394
    - rel. to solar activity 6396
  - periodic, Schaumasse, photometric obs. 6395
  - origin, and accretion 6398
    - inferences from reciprocal major axes dis 6401*
    - theory, etc. (book) 7396
  - notes on the Lyttleton theory 6399
  - and solar nebular origin of planetary system 640
  - icy conglomerate model 6402
  - nuclei, structure and evolution 6403
  - envelopes and streamers, fountain model 6404
  - tails, CO^+ pattern 6405
    - physical processes, rel. to solar activity 6406
    - origin of 6407
  - orbit tables 6499
- **Compressibility** see also *Elasticity; High-pressure ef*
  - purely cohesive matl: 3661
  - glass, under v. high press. 4435
  - MgCd alloy, isothermal and adiabatic 7210
  - glasses, review 8710
  - elastic material in earth's interior 8720
  - rutile, from spectroscopic data 8721
  - at extreme pressures, in earth's core 8805
  - gases
    - neopentane 74
    - Kr 75–6
    - "compressed He atom," ground state 2255
      - polarizability 2256
    - A, internal kinetic energy and polarizability c 2257
  - liquids
    - calculation from other properties 2999
    - rel. to internal press. 3898
    - adiabatic, hydrocarbon mixt., rel. to u.s. vel. 466
    - O, N, A, CH_4, H, from sound vel. meas. 4664
    - supercooled H_2O and D_2O 5319
    - molecular, of liq. mixtures 6527
    - amino acid and isomers, aq. solns., u.s. study 65
    - monatomic fluids, radial distrib. function calc. 6
    - molecular, 37 mutually soluble liq. mixtures 752
    - molecular distribution functions 8263
- **Compton effect**
  - operator for 4th-order radiative corrections calc.
  - Compton radn. spectrum, Be, graphite, diam 1090
  - in homogeneous magnetic field 2675
  - polarized γ-radn. detection 2676
  - double, exact theory 2678
  - multiple scattering, low-energy γ-radiation 3565
  - scattering non-relativistic limit 3877
  - scatt. by electrons with Maxwellian thermal distrib. 4327
  - collimated Compton spectra 4329
  - total cross-sections at 19·5 MeV 4330
  - X-ray, from Be and C, band struct. 4828
  - RaC γ-rays invest. 5028
  - suppression in γ-ray spectra of Ra(B + C), C Ta^{182} 5048
  - γ-quanta polarization in 180° scatt. 5696
  - initial distribution of electrons 7112
  - as example of non-local interactions 7438
- **Computers** see *Calculating appatatus*
- **Concrete**
  - slabs, density meas. using γ-radn. 1099
  - fracture mechanism 1951
  - shielding for nuclear reactors 7962, 8153
- **Condensation** see also *Drops; Fog*
  - N, in hypersonic nozzle 187
  - drop growth in clouds 566–7, 4503

Condensation—*contd.*
- liquid embryos, props. at solid surfaces intersection 1416
- vapour at a crystalline surface 1417
- Xe liq.-vapour coexistence curve, critical region 3244
- nuclei, formation by u.v. light 3775*
  - prod. by heated Pt, halogens effect 3776
  - counter, photog. recording 4501
  - fog, electron-microscope study 5244
  - data from sea spray elec. micr. anal. 7355*
  - AgI nucleating props., effect of r.h. 8128
- statistical theory 4055
- metallic vapours in hot surfaces 6711
- I^{131} vapour in airstream 8269

Conduction, electrical see also *Conductivity, electrical; Contact resistance; Current; Photoconductivity; Resistance, electrical; Semiconductors; Skin effect; Superconductivity*
- quantum theory of matter (book) 26
- resistance changes in mag. field, mech. 213
- thin films, electron mean free path 214
  - metallic, v. thin, various phenomena 4797
  - Ohm's law deviations 6764
  - oxide on Al, electron currents 6772
- mechanism in semiconducting phosphors 220
- metals, thermomag. and galvanomag. effects 836
  - changes at melting point 838
  - with pos. Hall coeff., electron inertia 986–7
  - optical props. and free electrons 8394
- two-band effect 1629
- polaron theory 1630
- ionic, in solids, pre-exponential factors 1633
- electron mobility, high fields, theory 1642
  - in polar crystals 6767
- electron mean free path, in Bi 2444
- coloured and uncoloured alkali halide crystals 2445
- bound electronic states due to "potential hill" 2446
- current amplification in filament transistors 2454*
- in completely ionized gas 3231
- intrinsic, in PbS, PbSe, PbTe 3299
- in liquid dielectrics 3341*
- slow electrons, motion, polar crystal 4475
- establishment of current in nonhom. medium 4794–6
- low temp., in v. degenerate semiconductors 4802
- in liquid iron oxide and silicates 5470
- electron scattering in crystals 6766
- in polar semi-conductors, theory 6781
- electron interaction with lattice vibrations 6980
- bridge for geophys. prospecting meas. 7663
- cold work and anneal effect on α-brass 7667
- tunnel effect at imperfect metallic contact 7674
- in mag. field, review 7675
- in liq. Se, thermoelec. power study 7691
- ionic crystals, review 8063
- semiconductor circuit elements, review 8413
- incomplete *d* shells exchange 8521

onduction, heat see *Heat conduction*

onductivity, electrical see also *Resistance, electrical; Semiconductors; Skin effect; Superconductivity*
- non-aqueous solutions 231
- metals, changes at melting 838
  - cubic, shear strains effect 2469
  - effect of gases 3636
  - effect of strong mag. fields 4108
  - Fermi-surface diffusion 6037
  - and alloys, effects of alloying 6789
- d.c., of *n*-primary alcohols 1615
- semiconductor, modulation by elec. field 1635
- dielectrics, high-voltage polarization rel. to elec. field 1643
- supercooled liq., discontinuities 2242
- impedance changes induced in luminescent powders 2380
- *m*-xylene, benzene, toluene, d.c. meas. 2457
- crystall. matl., effect of grinding 3294
- alkali metals, temp. var., rel. to vacancies 3632
  - rel. to optical constants 8395
- oxide cathodes, retarding potl. method 4180
  - BaSrCaO emitter 295
  - rel. to thermionic emission 6907
- gases at high temp. and press. 5471
- superconductors, normal conductivity det. 5483
- rel. to short-range order, solid and liq. state 6033

Conductivity, electrical—*contd.*
- of point contact, theory 6052
- alkaline earth titanates 6771
- microwave meas. and anomalous skin effect 6786
- temp.-conductivity coeff., solids and liquids, det. 6800
- thin films, in mag. field 6808
  - Pt, with dielec. covering layer 218
- conductivity tensor, ionized layer, crossed fields 6974
- soil, local lightning risk 7364
- glasses, d.c. measurements 7664
  - B–Tl glasses 857
  - alkaline boro-silicate 1639
  - surface, in damp atmosphere 6034
- solid salts, meas. apparatus 8015
- induced in insulators, by X-rays, temp. effect 8398–9
  - by electron bombardment, meas. 8450
- anthracene single crystal 6770
- B_2O_3–Na_2O and B_2O_3–K_2O, fused glassy state 4085
- BaS 294
- (BaSr)O and BaO 225
- Be; and relation to thermal conductivity 7621
- Bi_2O_3–CdO system, temp. dependence 6035
- sputtered CdO 224
- extremely degenerate semiconductors, CdO, low temp. 4802
- CdS, rel. to phosphorescence 1546
- CdS, X- and γ-ray effect 7668
- CsCl, near thermal transition 1631
- ordered Cu_3Au, electron bombard. effect 3730
- Cu_2O, temp. dependence, −190°c to 20°c 8402
- Cr_2O_3–Al_2O_3 catalyst 8412
- $CuSO_4$ and $Pb(NO_3)_2$ solns., ultrasonics influence 1214
- graphite single crystals 4086
- Ge, review 851
- Ge, electron mobility 221
- In–Pb, equilib. diagram invest. 2754
- InSb single crystals 8410
- KCl crystals, rel. to $K^{\pm}$-ions autodiffusion 4799
- magnetite, temp. dependence rel. to struct. changes 3297
- MgO single crystals, high temp. 4798
- NiS and NiS + Ag_2S, rel. to temp. and S vap. press. 848
- PbS, sintered 226
- PbS, effect of O 6055
- Si, review 851
- Si containing Al 841
- W oxides, high temp. 8796
- ZnO, absorbed O influence 1632
- **electrolytic** see also *Ion velocity*
  - in solids, pre-exponential factors 1633
  - dyestuffs in soln., foreign subst. effect 2783
  - strong non-assoc. electrolytes, theory 2785
    - voltage dependence 5752
  - electrolyte solns., theory 4445
  - high-field, of symmetrical valence type electrolytes 5753
  - strong electrolytes, superposed a.c. field 6287
  - of kation exchange membranes 6288
  - 2–1 salts in methanol, ion assoc. 7240
  - ultrasonics effect, Onsager theory calc. 7241
    - effect on ionic mobility 8267
  - high-frequency, in viscous solutions 8013
    - strong and weak electrolytes 8014
    - meas. method, density meas. appl. 7484
  - ionic conductance of solid salts, meas. app. 8015
  - iodine-pyridine solns. 8736

Conductivity, thermal see also *Heat conduction*
- liquids and vapours, law 4759
- **gases**
  - transport props. relationships 79
  - F 3017
  - gases, theory 3230
  - in completely ionized gas 3231
  - UF_6 4634
  - air, SO_2, H_2S, 0–50°c 4760
  - chemically reacting gas mixtures 5997
- **liquids**
  - liquid A, rel. to viscosity 1406
  - calc. from compressibility and density, etc. 2999
  - water, theory 4051
  - some cable dielec. matls. 4756

Conductivity, thermal—*contd.*
 solids
  BaF_2, CaF_2, compared 489
  crystal lattice, atomic admixtures influence 796
  adsorbed He on silica gel 805
  superconductors, rel. to mag. field strength 865
   Pb below 1°K 1647
   Sn below 1°K 3317
   Hg in intermed. state 6062, 8426
   in intermed. state, calc. 7687
  electronic, lattice vibration spectrum influence 1571
  Cr alums, low temp. 1573
  soil 2399
   frozen 3229
  polycrystall. solids, low temp. 2400
  graphite, lattice wave mech. 2463
   artificial, rods, 3300–3700°K 5996
  some cable dielec. matls. 4756
  dielec. solids, low temp. 4757
  low temp., metals 4758
   with high mag. field 6698
   Au, 2–150°K 6700
   Sn, In, Tl, Ta, Cb, and Al below 1°K 7688
  Al_2O_3 at high temp. 5995
  metals, Fermi-surface diffusion 6037
  Be, 50°C to 350°C 7621
  He 7632
 measurement
  poor conductors thermal charac., rapid det. 795
  plates, measurement without guard ring 1569
  soil resistivity, rapid meas. 1570
   from thermal diffusivity meas. 2399, 3229
  app. for h.p. det. 2402
  solids and liquids, app. 4756
  gases, hot-wire method 4760
   det. simult. with spec. heat and viscosity 5896
   hot-wire method, convection effect 6702
  time-variation method 5992
  liquids, non-stationary method 6696
  fibrous substances, method 6699
  by Poensgen plate method, reducing time 6701
Constants
 atomic
  Rydberg, re-evaluation of spectroscopic data 205
  $h/\sqrt{(em_0)}$ new electron diffract. det. 2485
 fundamental
  universal, in extended e.m. field eq. 2966–7
  quantum of action not fundamental? 6450
Contact angle see also *Wetting*
  rel. to boundary energies, low-energy solid 63
  liquid non-miscible metals, drop method 5329
  significance for sliding on ice 7226
  liquids on hydrocarbon surfaces 7491
Contact potential see also *Zeta potential*
  meas. methods, Kelvin and electron beam 826
   vibrating condenser 3284
   modified ionization method 4784
   in high vacuum 7650
  Se rectifiers 852
  contact theory, similarity theorem appl. 868
  Ge, surfaces 1637
   rectifier, changes during formation 6050*
  expression for 5451–2
  surfaces not electrified by metal contact 6748
Contact resistance
  between metal surfaces, various conditions 4100
  conductivity theory 6052
  on semiconductors 6779
  tunnel effect at imperfect metallic contact 7674
Convection see also *Heat transfer*
  initiation, flow patterns significance 179
  fluid sphere, heated within 1574
  onset by thermal instability, spherical shells 4053, 8356
  processes, fluid mechanics and applications 4761
  layer heated below and under Coriolis forces, instability 4762
  planetary convection theory, earth appl. 5223
  ratio to conduction loss, hot wire 6702
  from rotating horizontal cylinder 6704
  over parallel sources of heat 6705
  in porous media, theory, variational form 6706
  in electrolysis, theoretical review 7242
  heat loss from moving wall 7622
Cooling see also *Joule–Thomson effect; Low temper*
  production; Supercooling
  Hg arc cathodes, temp. gradients 1660
  hot wire, end cooling 2398
   convection/conduction loss 6702
  rate, effect on U allotropic transformation temp.
  heated cylinder, after steady state 5434
  coolants for nuclear reactors 7947
Copper
  films, electron mean free paths 214
   sec. electron emission, primaries below 10 eV
   radiation induced by α-particles 4449
   elec. conductivity phenomena 4797
  radiation damage and recovery 216
  fast electrons in, ionization loss and straggling
  creep, under deuteron bombardment 1194
   −196°C to 140°C 7220
   under stress pulses 7229
  thermoelectricity, due to asymmetrical temp.
   1649
   low-temp. study 7690
  anomalous Hall effect 1794
  cold work studies, low temp. 1992
   wire, effect on resist. 4109
   wire, Matthiessen's rule validity 4422
   intern. frict. and Young's mod. rel. to strain
   rel. to Young's modulus 7987
  oxidation, press. effect on rate 2007
   oxide layer flow 6247
  acoust. props, liq. N. temp. 2272
  anomalous skin effect invest. 2458
  electron-induced showers 2495
  deformed by rolling, X-ray study 2758
  plastically deformed, energy det. 2767
  electrodes, vac. spark emission charac. 3096
  vacancy pairs dissoc. energy calc. 3476
  fatigue tests, statist. interpret. 4425
  foil, proton energy loss 4873
   electron energy loss distrib. 7723
  surface tension at m.pt. 5323
  irradiated, isothermal annealing effects 5608
  elec. resistivity, extra due to vacancies 6036
   meas., liq. He temp. 7665
  thermal cond., low temp., mag. field 6698
  thermionic constant 6905
  coeff. of cathode disint. in elect. arc 7696
  friable cathode deposits, X-ray study 7980
  Bauschinger (work hardening) effect 7995
  electropolishing 8017
  Cu^{++} magnetization studies, low temp. 8560
Copper acetate
  anomalous paramagnetism 8559
Copper chloride
  $CuCl_2.2H_2O$ antiferromag. crystals, susceptibil
   2538
   reson. absorpt. 3423, 8540
  $CuCl_2.2H_2O$, sp. heat, 1·5 to 20°K 3269
  crystal, spontaneous magnetization 6939
Copper ferrite
  spontaneous magnetization 958
  microwave dielec. const. and permeability 4079
  ferromag. resonance 4212
  Cu–Ni ferrite, spontaneous magnetization, temp.
   8578
Copper oxide
  Cu_2O, semiconducting props. 2447
   elec. conductivity temp. dependence 8402
   Hall effect below room temp. 8403
  CuO, infrared sensitivity of cells 6798
   antiferromag. reson. 8541
Copper sulphate
  pentahydrate, anomalous paramagnetism 324
  aq. soln. elec. conductivity, ultrasonics influence
  Cu overvoltage polyvinyl alcohol influence 5757
  $CuCs_2(SO_4)_2$, paramagnetic props., theory 6931
Coriolis forces
  influence on atm. motion 4762, 5240
  sphere in a liquid 6517
Corona, electric discharge see also *Breakdown*
  point to plane disch., charac. at h.p. 256
   neg., pulse-free discharges 247
   neg., ring disch. mech. 1657
   neg., pulse and current meas. and obs. 7695

Corona, electric discharge—*contd.*
- ion formation, factors affecting 1709
  - by neg. wire, in room 3327
  - by pos. wire, in room 4116
- under const. potl., theory 3326
- current increase at const. amplification factor 4121
- corona press. and neg. Joshi effect 4122
- corona-stabilizer tubes, charac. var. 7703

Corona, solar see also *Astronomical spectra*
- ion recombination theory appl. 293
- radiowaves, electron-electron impacts effect on absorpt 338
  - noise from coronal prominence 3803
  - solar matl. eruption, outbursts data 3805
  - theory of origin based on noise meas. 5279
- Bartel's *M*-regions, localization 2911
- emission line intensities, calc. 2912
- geomagnetic activity correl., bright "*C*-regions" 4494, 7340
- theoretical model for arches 4563
- temp., rel. to line 6374 Å intensity 5280
- effect of interstellar polarization 5839
- inner, monochromatic fluctuations 5840
- rotation of inner corona 6426

Corundum
- transparency rel. to temp., Schumann region 140
- X-ray coloration saturation 3726
- several forms, magnetic susceptibilities 6954

Cosmic radiations, radio-frequency see also *Sun, radiation*
- H line emission, Galaxy 8
  - assoc. with interstellar matter 581
  - data on spiral structure 3824
- discrete sources, positions of six 9
  - angular sizes 1337, 2147
  - nature of radiation 7391
  - identification 8185
- from primary cosmic-ray electrons in galactic mag. field 2908
- galactic noise, cosmic electron source 5273
- radio astronomy, conf. rep. 6387
- origin of supernovae outbursts 7390
- simult. obs. of scintill. on 2 freq. 7392
- from Galaxy, model 7393
- thermal origin, difficulties 8186

Cosmic rays
- spread of soft component, diffusion equations 304
- cloud chamber photographs (book) 1717
- low-energy, apparent absence 1718
- at 650 m underground, concidences study 2521
- Störmer problem 3416
- students' lab. expt. 5548
- meteors as integrating cosmic-ray meters 6397
- splash albedo, returning radn. 7756
- new unstable particles, review 8488
- longitude effect of corpuscular stream from sun 8813
- **absorption**
  - *N*-component in Pb, ioniz. chamber meas. 309
  - fast muons energy range in rock 1726
  - far underground, interpretation 1731
  - γ-rays, rel. to shower curve 2nd max. 2523
  - nucleon component, at geomag. lat. 21°S 3411
  - in Pb, irregularities 3412, 8496
  - meson momentum distrib. up to 6 kMeV/C 3413
  - hard component, in water 4187
  - star-producing comp., 4000 m 5558
  - energy spectrum of soft component 6919
  - proton and meson spectrum at sea level 6920
  - shower producing particles in C, Fe and Pb 8497
- **apparatus** see also *Cloud chambers; Counters; Counting circuits; Ionization chambers; Particle track photography*
  - particle localization with scintillation detector 280
  - disortion meas. in emulsions 298
  - ionization chamber for *N*-component invest. 309
  - emulsion cloud-chamber, interactions study 311
  - nuclear plate sandwich, pos. excess meas. appl. 1714
  - unstable particles, lifetime det. from cloud chamber photographs 1716
  - slow mesons prod. in glass of plates 1719
  - ionization in counters, rel. to meson energy 2530
  - automatic ionization chamber 3378
  - aerostat for maintaining emulsions at high altitudes 3402

Cosmic rays—*contd.*
- **apparatus**—*contd.*
  - spark counters, short time interval measurements 3403
  - particle assoc. pairs, short time interval meas. 3404
  - balloon flight barograph 3768
  - momentum determinations from cloud-chamber photog. 4170
  - meteorites as integrating cosmic-ray meters 4182
  - cloud-chamber *V*-particle decay photog., neutron counters appl. 4196
  - balloon release mechanism 4893
  - plastic scint. counter meas., photons and electrons 4894
  - with aircraft-launched rockets 6328
  - counter tube measurements, anal. 6877
  - counting-rate meter 6913
  - bubble-chamber tracks, penetrating particles 7765
  - shower detection, scint. counters appl. 7767
  - mechanical hodoscope 8245
  - method for long high-altitude exposures 8810
- **composition**
  - nucleonic components, at high altitudes 300
    - energy spectrum at $\lambda = 50°$N 4898
    - low-energy, at large atm. depths 6923
    - in the atmosphere 7759
    - zenithal distrib. 7760
  - soft component, altitude dependence of rel. to hard component 302
    - diffusion eq. of spread 304
    - non-equilib., energy spectrum 5549
    - intensity rel. to hard component, underground 7754
    - electron and photon energy spectra 8485
  - rocket determination of ionization spectrum 303
  - "*N*" component of high-energy cosmic rays 1713
  - penetrating particles, assoc. pairs underground 2529
    - assoc. pairs at sea-level 3404
    - assoc. pairs at mountain altitudes 3405
    - in extensive air showers 3410
    - in electron-nuclear showers 7757
    - rel. to development of shower 7768
    - in upper atmosphere 7775
  - high-energy particles (book) 4193
  - at 1000 m above sea level 5550
  - 600–1000 M_e particles occurrence 5551
  - particles intermed. betw. meson and proton 5552
  - neutral/charged-particle ratio in interacting component 6121
  - heavy charged unstable particles, cloud-chamber study 6122
  - primary, rel. abundances (conf. rep.) 6437
    - low-energy, apparent absence 1718
    - negative, as part of radiation 2522
    - heavy, study 3406
  - size distribution of stars in emulsions 6914
  - existence of high-energy deuterons 7758
  - neutral, penetrating-shower-producing, collision lengths in H_2O and D_2O 7763
  - solar cosmic rays, variations 7764
  - S-particles 8483
  - new neutral particle? 8486
  - unstable particles review, 8488
- **alpha-particles**
  - from nuclear disint., energy distrib. 946
- **electrons**
  - low-altitude component from π-meson decay 941
  - primary, r.f. emission 2908
  - energy spectra, plastic scint. detector meas. 4894
    - range-energy rel. meas. 6919
    - in extensive showers 7766
    - and photons, differential, Pic du Midi 8485
  - from disintegrations in Pb, cloud chamber anal., 3500 m 7761
  - localization probability in extensive showers 7769
  - intensities rel. to photons, Pic du Midi 8485
  - knock-on, contrib. to showers 8492
  - electron component from π^0 decay 8508
- **mesons**
  - V-particles, nature 299
    - charged, decay 1931
    - V^0 prod. by penetrating shower secondaries 2526
    - decay, cloud-chamber photog., neutron counter appl. 4196

- **Cosmic rays**—*contd.*
  - **mesons**—*contd.*
    - V-particles—*contd.*
      - from penetrating showers 4896
      - V^0, mass 7956
      - Ω^0 (V_1^0) decay 8487
    - production, cross-section and freq. for neutral mesons 301
      - meson shower, statist. theory 306
      - slow mesons in photog. plates glass 1719
      - multiple, in penetrating showers 1730
      - differentiation between models 1735
      - multiple, π-mesons, in penetrating showers 4186
      - multiple, cloud chamber observation 6124
      - above 10 BeV 6928
      - showers, Fermi meson theory calc. 8495
      - from stars in emulsions 8505
    - sea-level, range distrib. at low geomag. latitudes 942
    - μ-mesons, energy loss in NaI crystals 947
      - vertical and inclined pos. excess 1712
      - spectrum. sea level 1715
      - fast, energy range relation, rock 1726
      - penetrating secondary component 2528
      - energetic, ionization 3407
      - interact. with U 4341
      - underground, interactions 6926, 7753
      - underground, anomalous scattering 8499
      - decay contribution to electron component 8507
      - fast, nuclear interaction 8509
    - pos. excess meas. at low energy 1714
    - unstable particles, lifetime meas. 1716
      - review 8488
    - measurements far underground, interpretation 1731
    - Coulomb and nuclear interact. with protons in Pb 1736
    - meson/heavy-particle ratio in emulsions 2520
    - gas ionization, rel. to energy 2530
    - momentum distrib. up to 6 kMeV/C 3413
    - π-mesons, multiple prod. in penetrating showers 4186
      - slow, and neg.-pos. ratio 6922
      - momentum spectrum 7779
      - interaction with nucleons 8489
      - production in different materials 8506
    - daily intensity var. 4190
    - high-energy nuclear physics conf. 4337
    - τ-mesons prod. in ice 4380
    - study at 1000 m above sea level 5550
    - slow κ, in stars 5560
    - mass at mountain altitudes 6123
    - spectrum, at sea level 6920
      - low-energy, at high geomagnetic latitudes 6921
    - asymmetry at geomagnetic equator 6924
    - electrons produced by 7166
    - intensity, and temp. of upper atmosphere 7752
    - component in electron-nuclear showers 7757
    - effect of latitude cut-off 8490
    - in shower theory 8493
  - **neutrons**
    - moderate-energy, E–W asymmetry 3417
    - prod. in elements, rel. to lat. and alt. 4191
    - spectra for 3 atm. depths 7759
    - producing protons and π-mesons 7779
    - data on H^3 prod. in atm. 7935
    - slow neutrons, abs. density distrib. 8484
  - **photons**
    - spectra, plastic scint. counter meas. 4894
      - and electrons, differential, Pic du Midi 8485
    - intensity at 70 000 ft 7762
      - rel. to electrons, Pic du Midi 8485
  - **protons**
    - Coulomb and nuclear interact. with mesons in Pb 1736
    - momentum spectrum, ang. distrib. E–W asymmetry 2527
      - protons prod. by neutral component, 3250 m 7779
    - energy spectrum, at sea level 6920
      - for 3 atm. depths 7759
    - component in electron-nuclear showers 7757
    - generation by neutral component 7778
    - primary, nuclr. explosion induction, high atm. 7780
  - **effects** see also *Nuclear reactions, cosmic rays*
    - close pair effect in stars 310
    - high-energy, primary, interactions, emulsion cloud-chamber invest. 311

- **Cosmic rays**—*contd.*
  - **effects**—*contd.*
    - single tracks, origin 945
      - analysis 1732
    - emitted α-particles energy distrib. 946
    - contrib. to meteorites He content 1340, 8510
    - interpretation of measurements far underground
    - 3-track disintegrations, mean energy 1733
    - star distrib., emulsions, statist. study 1734
    - ang. distrib. functions for high-energy particles
    - mesons and protons Coulomb and nuclear int tions in Pb 1736
    - photons in C due to penetrating shower second 2526
    - μ-meson penetrating secondary component 252
    - assoc. penetrating particles underground 2529
    - events in emulsions, mountain altitude 3405
    - high-energy particles (book) 4193
    - interaction with matter under 50 m water equiv 4194, 7781
    - star production transition effect 4195
    - cascade fluctuation problems 4197
    - interactions due to secondary shower particles
    - nucleon-nucleon collisions, energy calc. 4336
    - τ-mesons in ice 4380
    - star size distrib., altitude dependence 4898
    - splitting of nuclei, high-energy fragments 5055
    - delta rays, linear density 5529
    - generation of star-producing particles in Pb at 2 5559
    - slow κ mesons in stars 5560
    - high-energy interactions in Pb and light elements
    - heavy nucleus splitting 6128
    - tracks with small multiple scatt. and mini ionization 6364
    - neutron prod., especially by μ-mesons in Pb 69
    - electronic component from disintegrations in Pb
    - proton generation by neutral component 7778
    - generation of protons and π-mesons by neutrons
    - nuclr. explosions due to primary protons, high 7780
    - angular distribution of tracks in stars of low and energy 7782
    - growth of jet in a nucleus 7783
    - intervals between particles from same parent pa 7784
    - extreme energy stars, secondaries, anisotropic dis 7785
    - Ω^0(V_1^0) decay 8487
    - π-meson interaction with nucleon underground
    - Cherenkov light, intensity meas. 8504
      - night sky light pulses 4513, 8132
    - stars in emulsions, slow heavy mesons 8505
    - in S, Sn and Pb blocks at 2000 m 8506
    - μ-particle decay contribution to electron compo 8507
    - electron component from π^0 decay 8508
    - nuclear interaction of fast μ-mesons 8509
  - **origin**
    - theory rel. to interstellar gas 6386
    - elec. discharges in astrophysical systems 7386
    - betatron acceleration of particles to cosmic energies 7755
  - **showers and bursts**
    - cascade function for heavy elements 305
    - meson shower statist. theory 306
    - fluctuation problem in cascade theory 307
    - extensive, in air, absorption mean free path 308
      - air, photon component 1720
      - air, barometer effect 3408
      - air, alt. var. 3409
      - air, penetrating particles in 3410
      - density distrib. up to 2 m from axis 4897
      - cascade processes 5555
      - below ground 5557
      - air, time distribution of delayed particles 6916
      - air, lateral structure 6917
      - electron energy spectrum 7766
      - probability of electron localization 7769
      - particle zenithal distribution 7770
      - low-energy, lateral scattering 7772
      - origin theory 8493
      - zenithal distribution 8494

Cosmic rays—*contd.*
- **showers and bursts**—*contd.*
  - penetrating, from water and C 943
    - multiple meson production 1730
    - collision cross-sections 2524
    - at sea-level, origin 2525
    - secondaries 2526
    - from H, sea-level 4186
    - occurrence of unstable particles 4896
    - electron-nuclear components 7757
    - rel. to development of shower 7768
  - shower component in high-energy nuclear disint., plural theories 944
  - electrophoton cascades eq., solution methods 1721
  - shower curve 3rd and 4th maxima 1722
  - at small Pb thicknesses, transition effect 1723
  - bursts, origin 1724
    - seasonal var. 4188
    - correl. with night-sky light pulses 4513
    - underground, π-meson/nucleon interaction 8489
  - lateral scattering moments 1725
  - curve 2nd max., rel. to γ-ray absorpt. 2523
  - nucleon cascade in water 4185
  - secondary shower particle interactions 4198
  - shower prod. curve measurements 4895
  - scattering of particles in heavy elements 5553
    - E^{-1} spectrum 5554
  - Auger showers in atm. 5556
    - rel. to atm. density 6915
  - cloud chamber obs. of multiple meson prod. 6124
  - Rossi 2nd max., cloud chamber study 6918
  - scintillation counter detection 7767
  - barom. and temp. freq. coeffs. 7771
  - effect of latitude cut-off 8490
  - electron, in dense materials 8491
  - contrib. of electrons knocked on by μ-mesons 8492
  - shower development, calc. 8495
- **variations**
  - asymmetry studies at Hobart 1727
  - diurnal, underground, rel. to directional props. 1728
    - meson intensity var. 4190
    - effects of continuous emission from sun 4192
  - equatorial ring current effect 1729
  - E–W asymmetry, nucleon component 2527
    - moderate-energy neutrons 3417
    - and zenith angle distrib., nucleonic component 7776
  - altitude, of extensive air showers 3409
    - neutron prod. in elements 4191
    - star size distrib. 4898
    - intensity rel. at 3°N and 19°N 7777
  - latitude effect, emulsion det. 3414
    - and asymmetry 4189
    - neutron prod. in elements 4191
    - and fluctuations, high alt. and lat. 4899
    - low-energy nucleonic component 6923
    - vertical intensity, penetrating component, no effect 7775
  - anisotropy recorded in emulsions, high alt. 3415
  - seasonal, of bursts 4188
  - constancy of flux over 30,000 years 6125
  - energy dependence of 27-day var. 6925
  - solar, energy and composition var. 7764
    - world-wide changes in phase 7774
  - azimuthal asymmetry in stratosphere at equator 7773
  - deflection in solar mag. field 8500
  - zenithal distrib. penetrating component 8501
  - meteorological effects 8502
    - on penetrating radn. 4183
    - intensity increase in thunderstorm 4184
    - neutron intensity rel. 6126
  - and world-wide magnetic storms 8503
  - longitude effect of corpuscular stream from sun 8813

osmogony see also *Elements, origin*
- gravitational instability, turbulent medium 1336
- of solar system 1338
- expanding universe and galaxies origin 4559
- origin of stars 5270
- stellar cluster formation by gravitational condensation 5281
- evolution of stars and elements in a galaxy 6385
- Kuiper's, criticism 6388
- evolution of stars, review 7385
- comprehensive review 8183

Cosmology
- integration of the cosmological equations 19
- expanding universe, radiation press. theory 580
  - nebular clusters 2146
  - apparent disappearance of radiation 3850
  - and cosmological field 4558
- Birkhoff's gravitation theory, eq. of motion 595
- galaxies, large-scale distrib., dispersion 2906
- luminous intergalactic matter, effect on theories 2907
- Mach's principle 2924
- radiation sphere in Einstein universe 3079
- Hoyle's continuous creation theory 3797
- interstellar structures, gas clouds 3798
- ideal plasma eq. of motion 4222
- cosmic expansion in conformal space-time, and gravitation 4586
- layer heated below etc., instability 4762
- generalized magneto-hydrodynamic formulae 4919
- Lemaître's model, comparison with galactic line displacements 5271–2
- spiral nebulae, turbulence theory 5834
- new static models 5848, 8207
- method of dimensionless morphology 7384
- electrical discharges as source of high energy particles 7386
- comprehensive review 8183

Counter tubes
- gaseous contamination 275
- standards, testing 276
- standard terms 916
- proportional fission neutron counters 919
- simple automatic counter 925
- proportional, natural C^{14} activities appl. 1048
- photosensitive, use with scintillators 1699
- glass, self-quenching, photosensitivity 2504
- new apparatus, survey 3376
- 4π, proportional, radioactive standards maintenance 3539
- immersion, efficiency for β- and γ-emitters in soln 4154
- recent developments, England 4875
- BF_3, characteristics 4877
  - efficiency for fast neutrons 7191
- proportional, low-energy β-particles meas. 5027
- for β- and γ-ray detection, review 5534
- end-window, β-counting of gases containing P^{32} 6208
- analysis of particle measurements 6877
- Maze type (external cathode) 6882–3
- methylal filled, for strong radiation 7735
- proportional, energy resolution 8467
- **construction**
  - external cathode, hydrogen methylal filling 1697
  - high polymer films for windows 1967
  - extern. cathode, quenching agents 3375
  - β-counter, large-window 4157
  - β- and γ-ray detectors, review 5534
  - large thin-wall counter 6879
  - Maze-type, characteristics 6883
  - methylal filled, characteristics 7736
  - with transparent non-metallic cathodes 8468
- **discharge mechanism**
  - proportional counters in corona region 917
  - in A counters 918
  - X-ray pulse invest. 1695
  - with methylene halide fillings, decomp. products 1696
  - breakdown at high overvoltages 2503
  - argon–bromine counters 3372
  - self-quenching, factors influencing life 3374
  - low voltage, suitable gases 4156
  - $A–CO_2$, proportional, quenching of photons 4876
  - extending efficient range 6106
  - self-quenching, review 6874
  - external cathode, photosensitivity 6875
  - charge per count rel. to operating voltage 7734
  - localization of discharge 7737
  - A counters, build-up mech. 8466
- **operation technique** see also *Counting circuits; Statistical analysis, counters*
  - low-level counting techniques 285
  - gas counting methods for C^{14} 2646
  - pulsed operation 4155
  - BF_3, precautions 4877
  - proportional, α-particle precision counting 5682

A complete list of the Subject Headings will be found at the end of the Index.

- **Counter tubes**—*contd.*
  - **operation technique**—*contd.*
    - testing method 6105
    - external cathode counters, thermal treatment 6876
    - parallel-plate, operation below breakdown voltage 6880
    - effect of intense β-rays on α counting 6881
  - **special applications** see also *Counters, special applications; Radiation monitoring*
    - automatic, for C^{14} age det. method 926
    - X-ray crystallography techniques 2073
    - G.M. monitors, X-ray calibration 2640
    - small single crystal X-ray intensities meas. 3738
    - activity distrib. study in radiography 4538
    - G.M. counter X-ray diffract. spectrometer 5207
    - geological studies 5796–7
    - proportional, fluorescent X-radn. anal. appl. 6076
    - γ-ray detector with low neutron efficiency 6214
    - stomach counter for P^{32} 7738
    - recorder for radioactive aerosols 7742
- **Counter tubes, accessories** see also *Counting circuits*
  - circuit for limitation of discharge 927
  - slow-counting-rate, calibration devices 1702
  - neutron, apparatus for BF_3 filling 3379
  - 20-stage cold-cathode tube 5540
  - quench circuit for counters in radioactive C meas. 6878
- **Counters** see also *Counter tubes; Ionization chambers*
  - Cherenkov, resolving time limitations 282
    - convenient assembly 6888
  - needle, metall. transformations detect. appl. 801
  - Rosenblum spark counter 1701
  - spark, for cosmic ray meas. 3403–4
  - high-sensitivity fission counter 3622
  - recent developments, England 4875
  - **operation technique** see *Counter tubes, operation technique; Counting circuits; Statistical analysis, counters*
  - **scintillation**
    - scintillators and energy transfer processes 147
    - ZnS screens, uniform, nonhydrogenous 148
      - response to α-rays < 5 MeV 6881
    - plastic scintillators satn. effect 154
    - fluorescent scintillators, nature of satn. effect 155
    - discrimination against noise 278
    - anthracene, fast-neutron spectrometer 478
      - efficiency for low-energy electrons 4878
      - abs. efficiency for α-particles 6890
    - liquid, β-counter 921
      - review 279, 1700
      - cell design 2377
      - 2 neutron detectors 4396
      - efficient neutron detector 4397
      - free neutrino detection expt. 5112, 6108
      - of tritium-labelled compounds 6885
      - large area 6916
    - energy addition effect, combination peaks 922
    - high-energy particles appl. 923
    - phosphor-phototube γ-ray detector 924
    - cosmic-ray μ-mesons energy loss in NaI crystals 947
    - for detection of contam. by α-emitters 1698
    - review 1700
    - scintillation crystals, energy dependence 2376
    - micro-curie amounts of radon meas., appl. 2639
    - NaI/TlI, for γ-ray, automatic recording 2673
    - LiI activation by Eu 4026
    - tri-α-naphthylborine, thermal neutrons appl. 4158
    - high-resolution detector for high-intensity radn. 4159
    - scintillation spectrometers, resolution 4160
    - betatron monitor and integrator 4161
    - increasing effective resolution 4162
    - high-resolution coincidence instrument 4879
    - γ-ray spectra quantitative eval. 5037
    - statist. fluctuations, generating functions theory appl. 5538
    - LiI(Sn), slow neutron detector 5539
    - NaI, energy resolution of γ-radn. up to 18 MeV 6109
    - 2-crystal γ-ray spectrometer 6110
    - short β-decay lifetime meas. appl. 6195
    - characteristics and applications (book) 6884
    - plastic solid solutions invest. 7592
    - CsI, α-particles 7601
    - cosmic-ray shower detection appl. 7767
- **Counters**—*contd.*
  - **scintillation**—*contd.*
    - directional correl. meas. appl., correction 7858
    - B layer, for neutron detection 7963
    - naphthalene, ageing effect 8470
  - **special applications** see also *Counter tubes, spe applications; Radiation monitoring*
    - scintillation, particle localization 280
      - use for γ-radiation dosage meas. 920
      - β-spectrum invest., Tl^{204} 1069
      - ultra-short time interval meas. 4163
      - indirect autoradiog. appl. 4547
      - airborne counter for surveying 6887
      - liquid, for biolog. assay 6889
      - unit for drill-hole logging 6891
    - spark, v. small time interval meas. 4631
    - geological studies 5796–7
- **Counters, accessories** see also *Counter tubes, accesso Counting circuits*
  - 2 new photomultipliers 930
  - photomultipliers, review 1699
  - scint., long-time stability power supply 4167
  - photomultipliers specially adapted for scint. coun 4880
  - photomultiplier stabilizer 7743
- **Counting circuits**
  - scaling circuit, ferromagnetic 284
    - using dekatron tubes 283
    - decades with 4 double-triodes 5541
    - testing method 6105
    - channel-selecting scale-of-50 6114
    - improved fast scaler 6894
    - using multi-electrode cold-cathode tubes 6895
  - high-speed, for scint. counters high-energy parti appl. 923
  - for limitation of counter discharge 927
  - pulse-amplitude analysers, review 928–9, 2505, 55
    - electron-optical method 4881
    - design 4165
    - applications 4166
    - selector, interval stability 6111
    - for low rates 6112
    - optical method using grey wedge 6113
  - coincidence, for fast particles 1703
    - fast system for high-energy particle detect. 416
    - -anticoincidence, fast analyser 8473
  - pulse amplifier giving temporal selection 1704
  - pulse timing circuit 1865
  - Rosenblum counter use with coincidence syst 2506
  - new apparatus, survey 3376
  - devices for non-uniform pulses 3380
  - counting rate meas. by interval sampling 3381
  - ionization chamber pulse amplifiers, backgro noise 3382
  - for Wilson chamber control 3383
  - decimal counter electron tube 3385
  - time interval meas., spark counter 4631
    - ultra-short, with scint. detector 4163
  - gated decade counter, no feedback 4168
  - recent developments, England 4875
  - pulse-amplitude analysis with vibration galvo. 48
  - time selector for neutron time of flight 4883
  - for β- and γ-ray detectors, review 5534
  - for slow neutron detector 5539
  - 20-stage cold-cathode tube 5540
  - quench circuit for gas counter in C^{14} meas. 6878
  - scintillation unit 6891
  - voltage impulses reprod., proportional amplifier 6
  - counting losses due to dead-time effects 6893
  - multi-electrode tube for scaling unit 6895
  - cosmic-ray counting-rate meter 6913
  - 10-channel pulse interval analyser 7063
  - gas triode as pulse amplifier 7733
  - monitored G.M. X-ray meas., dead-time correcti elim., 8472
- **Cracking** see *Fracture*
- **Creation of electron pairs** see *Electron pairs*
- **Creep** see also *Slip*
  - metals, strain-hardening influence 493
  - plasticity conf. rep. 1192
  - Cu, under deuteron bombardment 1194
    - under stress pulses 7219

eep—*contd.*
- Zn, single crystals under direct shear 1195–6, 6276
  - clean and oxide-coated crystals charac. 3669
- metals, stochastic theory 1952
- dislocation theory, review 3648
- of metals (review) 3651
- extensometer, for single crystals 7217
  - high sensitivity 7478
- generality of cubic creep function 7218
- in pure metals, Cu, Al, Cd, transient 7220
- and recovery in metals, review 7221
- in compressed metal powders 7967
- in work-hardening theory, metals 7996
- Al, at elevated temp. 8725
  - pure, low-stress, torsional 4427
- flow law of ice 8808

istobalite
- structure, i.r. reflection study 1519

itical constants, thermal
- critical temp. of solids 183
- Xe liq.-vapour coexistence curve 3244
- Xe vertical distrib. near crit. pt. 3245
- av. kinetic and potl. energies at critical point 4057, 8364
- UF_6 4634
- for 17 elements, 164 org. compds., 40 inorg. compds., bibliog. 6714
- CO_2–N_2O system 6715
- liquid/solid He 6725
- temp. and press. rel., normal paraffins 8363
- CO_2 kinetic energy at crit. point 8365

yolite
- fused, with dissolved alumina, electrolytes charac. 509

yoscopy see *Freezing; Low temperature*

ystal chemistry
- synthesis of fluorophlogopite mica 2804
- of the Laves phases 2827
- valency electrons, positional relationship 3729
- and electron diffraction review 5786
- of $NiCl_2.2H_2O$ type compds. 6320
- space correlation of outer electrons 8057
- 5*f*-series study, Th_4H_{15}, struct. 8094

ystal properties
- surface phenomena, theory 2032
- matter tensors in symmetrical systems 7965
- **electrical** see also *Piezoelectricity*
  - paramagnetic resonance phenomena 124
  - piezoelectricity and ferroelectricity, rel. to struct. 209
  - transistors, distribution of action 219
    - review of electronic mechanism 854
  - resistivity, increase on quenching, and vacancies 536
    - deformation effect, temp. rel. 1648
    - effect of grinding 3294
  - semiconductors, overlapping impurity carriers, energy states 846
  - rectifier's temp. effect and neg. resist., 850
  - injected carriers' detect. by absorpt. and emission 861
  - tetragonal antiferroelectric crystal (deuterated ADP) 1237
  - *F*-centres formation during irradiation 1250
  - Clausius–Mosotti eq. for anisotropic crystals 1605
  - ionic crystals, dielec. props. 1619
  - ionic conductivity, pre-exponential factors 1633
  - cubic metals, effect of shear strain 2469
  - insulating crystal defects, internal field emission 2478
  - synthetic fluorophlogopite mica 2804
  - intercrystallite capacitance, thin films 4093
  - dielectric breakdown, rel. to crystal direction 4824, 5494
    - single crystal, directional 8438
  - dielec. loss angle temp.-freq. dependence 5462
  - field emission and work function, individual surfaces 6078
  - e.m. wave propag. through crystal plate 6576
  - expl. of ferroelectricity 6757
  - polar scattering of conduction electrons 6766
  - space-charge layer and lattice defects distrib., surface 7298
  - ionic crystals, electrochem. review 8063
  - piezoelec., tech. for testing 8393
  - electron multiplication in insulating crystals 8439
  - dielec. const. temp. var., rel. to lattice defects 8774

Crystal properties—*contd.*
- **electrical**—*contd.*
  - AgBr ionic mobility at grain boundaries 2011
  - AgCl photosensitivity bands 7679
  - alkali metals resist. temp. var., vacancies theory 3632
  - alkali halides, coloured and uncoloured, conduction 2445
    - polarization field effect on reson. freq. 4082
  - alkaline earth titanates 6771
  - anthracene, conductivity 6770
  - $BaTiO_3$, domain properties 208
    - single crystals, dielectric props. 4788
    - metastable states 5454*
    - dielect. meas., 120°C transition 8392
  - CdS, breakdown theories 876
    - single crystals, luminescence in d.c. fields 766
    - conductivity rel. to phosphorescence 1546
    - surface layer noise 4807
    - photoconductivity, high temp. 4811
    - polycryst., internal photoelec. effect 5473
    - photoconductivity var. under X-irradiation 6792
    - conductivity, effect of X- and γ-rays 7668
    - surface photoconductivity 8425
    - differential ionization by α-rays 8480
  - Ce, resistivity anomaly 840
  - CsCl, conductivity near thermal transition 1631
  - Cu_3Au, resist. changes on ordering 2753
  - Ge, heat treated, activation energy of acceptors 223
    - *p–n* junctions prod. by growth rate var. 229
    - grain boundary barriers 845
    - acceptors by quenching from high temp. 847
    - review 851
    - single-crystal 858
  - graphite, conductivity 4086
    - polycrystalline 4087
  - I, photoelec. constants 6797
  - ice, anisotropy of diel. const. 4789
    - piezoelectricity invest. 5465
  - InSb, Hall effect and conductivity 8410
  - KBr, colour centres and trapped charge 4478
    - photocurrent, space-charge buildup, field emission 8397
  - KCl, electric strength 1620, 6759
    - paramag. reson. rel. to *F*-centres 2546
    - elec. strength temp. rel. 3342
    - colour centres and trapped charge 4478
    - K^+-ions conductivity 4799
  - KH_2PO_4, ferroelectric state 4073, 8387
  - MgO, single crystals, high temp. conductivity 4798
    - u.v. induced photocond., rel. to coloration 7682
    - secondary emission 7724
  - $ND_4D_2PO_4$ (deuterated ADP) 1236
  - NaCl, with impurities, dielec. losses 3293
    - temp. rel. of electric strength 3342
  - NaI μ-meson energy loss 947
  - Na niobate, ferroelectric 550
  - Ni–Fe–Mo alloy, resistance anomalies 2442
  - PbS, sintered, conductivity and Hall coeff. 226
  - PbTe, transistor action 2456
  - quartz, piezoelec. resonance up to 5000 atm. 835
    - piezoelec. oscillations preferred freq. 8279
  - Rochelle salt, piezoelec. voltage meas. 1625
  - Se, Brown effect 2459
  - Si, review 851
  - SiC, green, light emission due to current 1554
  - TiO_2 semiconductors 8414
  - W monocrystal, electron work function at faces 885
  - Zn, effect of abrasion on photoelect. 8442
  - ZnO single crystals 6782
  - ZnS single crystals, photoconductivity 860
- **magnetic** see also *Paramagnetic resonance absorption*
  - antiferromagnetism of atoms on different lattice sites 319
  - cubic antiferromag. crystal, low temp., parallel susceptibility 960
  - orbital angular momentum quenching 970
  - 32 inorg. phosphors, paramag. reson. 972
  - de Haas–van Alphen effect, interpretation 1753
  - magnetostriction, single crystals, meas. 2578
    - review 3472
  - domains of reverse magnetization 3440
  - antiferromagnetic resonance at abs. zero 6937
  - crystals containing rare-earth ions 7797

Crystal properties—*contd.*
  magnetic—*contd.*
    mag. anisotropy, organic crystals, low temp. 7798
    new results on ferro- and antiferromagnetism 8532
    u.s. attenuation in magnetic single crystal 8602
    rel. to atomic arrangement, review 8769
    Ce ethyl sulphate 2545
    Co ferrite single crystals, magnetostriction 1795
    forms of corundum, susceptibilities 6954
    Cr alum, crystalline field 969
    $CuCl_2.2H_2O$, antiferromag., susceptibilities 2538
    $CuCl_2$, spontaneous magnetization 6939
    Fe, magneto-thermoelec. power, low temp. 1650
    Fe single crystal domain structure 6961
    FeF_2, CoF_2, magnetic anisotropy 8546
    Fe–Ni alloys, anisotropy and magnetostriction 2579
    ferrites (magnetite), magnetocrystall. anisotropy effects 8533
    Ferroxdure, magnetization charac. 961–2
    Ge Hall effect, appl. 3470
    graphite, polycrystall., susceptibility 2533
    haematite antiferromagnetism, rel. to struct. 2825
    In magneto-resist. effect, low temp. 3319
    KCl, coloured, mag. susceptibility, 1°K to 300°K 4903
    magnetite, magnetocrystall. anisotropy effects 8534
    Mn in ZnS, effect of compression on mag. reson. 6945
    MnBi, powdered, as permanent mag. matl. 320
    Mn–Zn, Co–Zn ferrite single crystals, ferromag. reson. 4214
    Ni single crystal, Bitter figures 8550
    Ni ferrite single crystals, magnetostriction 1795
    Permalloy, uniaxial anisotropy in mag. field 8530
    Si–Fe, domain structure near cavities 1764
      poly- and single crystals, powder patterns 8549
    Sn magneto-resist. effect, low temp. 3319
    V^{+2} Tutton salt paramag. reson. absorpt., rel. to orientation 1752
    Zn, low temp. Hall effect 1793
  magneto-optical
    Co III triethylene diamine 7810
  mechanical   see also *Piezoelectricity*
    protein, densities det. 529
    density and expansion, effect of internal strains 535
    elastic wave propagation 687
    acoustic waves polarization, cubic crystals 691
    metal, cleavage surfaces, plastic deform. 1164
    hardness, anisotropy 1199
    metal single crystals vibr. strain pattern 1979
    slip onset criterion, metallic polycrystals 1984
    metal crystals, work hardening 1991
    correl. between thermal and elastic data 2063
    piezoelectric plates, electro-mech. vibr. system 2439
    energy stored during plastic deform. 2767
    critical shear stress and temp. 3658
    deformation bands, struct. 3659
    plastic deformation by glide 4419
    wave propag. in piezoelec. crystals 4792
    mutual grinding hardness invest. 6277
    density decrease due to colour centres 6308
    pure glide in metal crystals 7212
    single crystal extensometer 7217
    creep and recovery, review 7221
    dislocations and plastic flow (book) 7275
    lattice expansion by added atoms 7287
    internal strain effect on expansion and density 7288
    "3rd order" elastic coeffs. 7990
    dislocations and elast. const. calc. 8058
    u.s. attenuation in magnetic single crystal 8602
    elastic and piezoelect. props., and atomic arrangement, review 8769
    Ag deformation, high temp. 1982
    AgCl elasto-plastic stress anal. 6678
    Al single crystal, anisotropy of indentation 1193
      long slip 6267
    Al alloys, natural ageing 7979
    Al–Cu, single crystal, deform. by repeated blows 3653
    brass single crystals, yield points 7993
    calcite cleavage faces behaviour 1161
    CdI_2, effect of deformation on growth 2044
    Cu, cold-worked, int. frict. and Young's mod. rel. to strain 7216
    diamond elastic constants, X-ray reflection method 8066

Crystal properties—*contd.*
  mechanical—*contd.*
    Fe–Si single crystals domain patterns rel. to poli
      1165
    Ge, plastic deformation 1190–1
      u.s. elastic const. meas. 7989
    graphite single crystals, self-diffusion 1169
    LiF, commencement of fracture 5739
    $ND_4D_2PO_4$ (deuterated ADP) 1236
    Ni single crystals 4416
    quartz, piezoelec. oscill., preferred freq. 8279
      cracking rel. to transition, 5203
    rock salt single crystals, fatigue, optical invest.
    rutile elastic const. from spectroscopic data 872
    Si plasticity 1190–1
      u.s. elastic const. meas. 7989
    Zn crystals, creep under shear 1195–6
      yield points, bending expts. 1988
      yield point rel. to dissolved N 1989
      clean and oxide-coated, creep charac. 3669
      creep 6276
      cleavage fracture 8724
  optical   see also *Colour centres; Counters, scintilla*
    Luminescence; Raman spectra
    i.r. spectrum, frequency directional variation 12
    photoconductivity in the elements (book) 234
    admixtures in dielectric's luminescence and abs
      tion 747
    i.r. sensitive phosphors development history 773
    F-centres formation during irradiation 1250
    powders, absorpt. coeff. by diffuse reflectance 1
    luminescence and trapping in phosphors contai
      Ga 1545
    photochem. sensitization, mech. 2019
    scintillating crystals, energy dependence 2376
    single organic crystals, polarized fluorescence 31
    cathodoluminescence, saturation and voltage ef
      3172
    phosphorescence mech., sulphide phosphors 472
    optical parameter det. by reflected light 5380
    Raman effect of organic mixed crystals 5407
    circular dichroism 5429
    light wave propag. through crystal plate 6578
    anisotropic crystals, refractive index det. 6595
    coloration and luminescence (book) 7295
    light absorpt. by trapped electrons 7296
    class *m*, error in classification 8043
    phosphors, effect of high elec. fields 8334
    rel. to atomic arrangement, review 8769
    corpuscular theory of lattice diffraction 8779
    AgCl photosensitivity bands 7679
    alkali halide, colour centres, 5°K 1251
      Tl^+ effect 8329
      mixed, *F*-band posn. rel. to lattice constant 87
      mixed, *V*-bands posn. 8778
    alk. earth halides spectral location of colour ce
      absorption 5399
    alk. earth compds., X-ray induced absorpt. ba
      enhancement 1538
    anthracene, polarized u.v. absropt. 4711
      single crystal, polarized fluoresc. 6653
      in naphthalene, mixed crystals, fluoresc. cha
        8341
    $BaTiO_3$, anomalies 4788
    benzene monocrystals, absorpt. in polarized light
    CaF_2, thermoluminescence 2369
      colour centre equiv. to alk. halide *F*-centres 87
    CdF_2 transmittance 4023
    CdS, edge luminescence and photoconductivity 1
    chrysene, single cryst., polarized fluorescence 66
    Co III triethylene diamine, molecular absorption 7
    diamond, absorpt., reversible bleaching of band 8
    fluoride single crystals, i.r. transmission limits 31
    Ge, i.r. absorption 144
    hackmanite, refractive index 7548
    hexamethylbenzene, modifications in polarized l
      1252
    KI(Tl) fluorescence, by heavy charged particles 8
    LiF, irradiated, colour centre formation phenom
      6646
    MgO refractive index 3090
      u.v. coloration and photocond. rel. 7682
    NaCl single cryst. light scattering 783, 7613

A complete list of the Subject Headings will be found at the end of the Index.

Crystal properties—*contd.*
optical—*contd.*
NaI scintillators, surface effect 5970
NaI(Tl) scint. response to pos. ions 5976
$PbNO_3$, photoelastic constants 8346
phenanthrene, single cryst., polarized fluoresc. 6653
pyrene, single cryst., polarized fluoresc. 6653
pyrimidines, polarized u.v. light absorption 760
Si, i.r. photoconductivity due to impurities 2462
green SiC, light emission due to current 1554
stearic acid 7283
T_2O, luminescence behaviour 1542
Te, i.r. refractive index 145
thoria, crystalline 763
trypaflavin in citric acid, phosphorescence anisotropy 2051
ZnO, thermal colour change mechanism 758
single crystals 6782
ZnS phosphors, luminescence, lattice defect effects 5972
thermal
crystal energetic relationships in oxysalts 497
conductivity, influence of atomic admixtures 796
low temp. 4757
ditto, polycrystalline solids 2400
charac. temps. and "Debye heat waves" 2063
synthetic fluorophlogopite mica 2804
explosion initiation by heating, size effects 8735
alkali halides, instability and melting 4471
ammonium dichromate, new transition 800
$BaTiO_3$ single crystals, temp. changes 5778
Cu_3Au_1 short range order, theory 7294
KCl, rate of evap. from faces 6709–10
ZnO lattice absorpt. edge shift 758
Crystal structure
Zn kinking rel. to twinning 2803
Sn single crystal, macromosaic structure 7273
axis persistence through thermal transformation 8107
domains, $BaTiO_3$ 208
Cu_3Au, formation by diffusion 4408
Rochelle salt and KH_2PO_4 4481
wall motion, ferrite crystals 8575
Pb titanate, twinned 8761
Crystal structure, molecular see also *Crystals, electron states; Crystals, lattice mechanics; Electron diffraction crystallography; Neutron diffraction crystallography; X-ray crystallography*
dielectrics, rel. to piezo. and ferroelectricity 209
internal strains effect on X-ray lattice const. 535
disorientations det. by X-ray diffract. 2074
nucleation, review 3714
construction of ball-and-spoke models 5201
lattice expansion by added atoms 7287
internal strain effect on latt. const. and density 7288
contour lines, optical representation 8091
phys. props. and atomic arrangement, review 8769
Raman effect in solids, review 8336
elements
deviation from close packing in hexag. metal crystals 1799
Ag, small crystals 1267
Ag, Au, Cu, electron diff. consts. compared to X-ray 8804
Al single crystals, deformation and polygonization 2076
Bi, light-figure method 4462
Co single crystal phase trans. 4764
molec. beam condensations 2078
diamond, electronic structure 5202
Ge, diamond struct. demarcation 1240
graphite in cast iron 2050
He, solid 6725
Hf lattice constants 3243
Mg molecular beam condensations 2078
white P 1258
Se, β-phase 8093
Ti, crystallography of transformation 8095
Zn, molecular beam condensations 2078
lattice constants and distortions, meas. 7321
twin production 7322
Zr lattice constants 3243
alloys
phase reactions study, amalgams setting 549

Crystal structure, molecular—*contd.*
alloys—*contd.*
inclusions in ageing alloy 1971
superlattices in ternary alloys 2080, 4485
binary solid solution, atomic distrib. 2583–5
correl. betw. radius ratio, phase composition and structure 5213
order-disorder transitions and lattice vibrations 8773
metal carbides and nitrides, type *MX* 8795
Ag–Al, clustering of Ag atoms 8102
Ag–Mg–Sn and Ag–Mg–Zn superlattices 7326
$BaCd_{11}$ 8099
CrSb, rel. to antiferromagnetism 8528
Cu_3Au, electron bombard. effect on order 3730
Cu–Fe, line broadening by ppte. 7201
Cu_4MgSn ternary phase 5217
Cu–Mn–Al, superlattice formation 2080
Cu_2Te, CuTe, Cu_3Sb, InTe, Bi_2Se_3, Pd_5Sb_3 and Pd_5Bi_3 8097
α Fe, C interstitial position 8794
Fe–Al–Si, superlattices 4485
Fe–Cr superlattice 547
Hf–H system study 1262
In–Pb 2754
$C_{14}(MgZn_2)$, $C_{15}(MgCu_2)$, $C_{36}(MgNi_2)$, Laves phases 2827
Mn nitrides 546
Zr–Hf, lattice constants 3243
inorganic compounds
substances with spinel-type struct. 1264
randomly stacked layers, clay minerals 5221
higher oxides of metals, periodic system 1st group 5784
H positions in hydroxide lattices 6313
water molecules in crystals, symmetry 6663
perovskite type, expl. of ferroelectricity 6757
D effect on H bond distances 7291
rare-earth titanates with perovskite structure 8106
influence of dipole moment on lattices 8770
AgCl, AgBr, NaCl, KCl electron diff. consts. compared to X-ray 8804
AgBr small crystals 1267
Ag sulphimide, $Ag_3(NSO_2)_3$ 8109
AlOOH, new form 6255
$AlPO_4$, Raman and cathodoluminescence spectra invest. 7596
alkali halides, surface structures on evaporation 7285
aluminas and their hydrates 1261
anatase 5214
B_4Cl_4 5642, 8103
Ba, Sr and Ca triple carbonate 4487
$BaFe_{18}O_{27}$ 1263
Ba sulphate high-temp. forms 6319
$BaTiO_3$, static model at room temp. 1617
Bi_2NbO_5F and isomorphous compds. 2082
boric acid, H bonds 4488
disordered boric acid, electron diffract. 8119
phosgene, $COCl_2$ 7328
epidote, $Ca_2Al_2FeSi_3O_{12}(OH)$ 7335
diCa silicate α-hydrate 7334
Ca sulphate, high-temp. form 6319
calcite 6828
Cd complex tetrathiocyanates 7329
ClF_3 at − 120°c 4265
CoO, antiferromag. struct. deformations 8098
Cr alums 1573
Cr_4B, Cr_2B, Cr_5B_3 5215
CsS_6 2824
dioptase, $Cu_6(Si_6O_{18}).6H_2O$ 2083
$Fe_{1-\epsilon}S$ (pyrrhotite), defect structure 8061
fluorides of tysonite or LaF_3 type 2822
$HNO_3.3H_2O$ 2831–2
haematite rel. to antiferromagnetism 2825
Hg complex tetrathiocyanates 7329
HgCl electrochemically formed on Hg 3713
iodic acid, i.r. spectrum freq. rel. to orientation 4710
LiH, ionic state in crystal 4484
Li perchloride, i.r. spectrum freq. rel. to orientation 4710
$KCo(NO_2)_4(NH_3)_2$, structural type 7332
$K_2CrO_4.KMnO_4$ 4486

Crystal structure, molecular—*contd.*
  inorganic compounds—*contd.*
    KH_2PO_4 8387
      ball-and-spoke model construction 5201
    K_2HgCl_4, H_2O and $K_2SnCl_4.H_2O$ 6139–40
    K_2NiF_4 8105
    $K_6(P_2W_{18}O_{62}).14H_2O$, 9(18)-heteropoly anion struct. 2830
    $K_2[Pt(NO_2)_4Br_2]$ 8108
    $K_2Pt(NO_2)_4Cl_2$ 8108
    $KVO_3.H_2O$ 7333
    La with absorbed D 7325
    LiF, transmission studies 7301
    $LiF–BeF_2$ system 6318
    LiH ionic state, det. not possible 4484
    magnetite transformations rel. to conductivity changes 3297
    Mg ferrite–aluminate powders 8116
    $MgSO_4.7H_2O$ and $ZnSO_4.7H_2O$ Raman spectra similarity 4729
    milarite 8797
    $MnCl_2.2H_2O$ 2829
    MnTe, antiferromag. struct. deformations 8098
    MoO_3 electron fringes rel. to structure 898
    Mo and (Mo, W) oxides, struct. related series 2079, 8060, 8104
    $Na_2CO_3.7H_2O$ 5218
    $NaK_5Cl_2(S_2O_6)_2$ and $NaK_2Cl(S_2O_6)$ 2833
    Na niobate 550
    hexaniobate ion in $7Na_2O.6Nb_2O_5.32H_2O$ 5219
    NaPb 2823
    Nb–N compds. 6317
    NiB 1260
    Ni carbonyl 7327
    $NiCl_2.2H_2O$, electronographic det. 6320
    Ni ferrite 8526
    NiO 1259
    reddingite, $P_2O_5.3FeO.3H_2O$ 3745
    PbI_2, electron fringes rel. to struct. 898
      vacancies made visible elec. microscopically 5133
    α–PbO_2 6316
    Pd_2Si, Pt_2Si, Pd_2Ge, Pt_2Ge 552
    PdO 8101
    Pr salts, from absorption spectra 1516, 6625
    Pt complex tetrathiocyanate 7330
    PtO_2 548
    quartz 8072
      expansion by fast neutron bombard. 2826
      surface treatment effect on X-ray diffract. 4410
      i.r. spectrum freq. rel. to orientation 4710
      cristobalite, silica, by i.r. reflection 1519
    Rh complex hexathiocyanate 7331
    rocksalt, electron density distrib. 7323
      ion distortion of lattice 2059
    rutile 5214
    SeF_4 8803
    SiO 5216
    spinels, superstructure 2081
      1 : 4 existence 3744
    $Sr(OH)_2.8H_2O$ 8110
    Sr sulphate, high-temp. form 6319
    Th_4H_{15} 8094
    $U(OH)_2SO_4$ 551
    $U_6O_4(OH)_4(SO_4)_6$ 5220
    UO_3 7324
    $(U, Th)O_2$ solid solutions 6953
    V_2O_5, near transformation temp. 6951
    W oxides, high temp. thermal and elec. props. 8796
    Zn complex tetrathiocyanates 7329
    Zn ferrite 8526
    ZnO, anomalous lattice constants 8100
  organic compounds
    statist. theory of crystallite length, polymers 371
    α-helix packing, coiled-coils 8786
    $BaCa_2$ *n*-butyrate phase transitions 182
    sucrose 553
    proteins, globulite units 554
      review of advances 2084
      single crystals, cut-off phenomena 2085
      4 unit cells 3751
    hexamethylbenzene, modif. in polarized light 1252
    $Te(CH_3)_2I_2$ 1265

Crystal structure, molecular—*contd.*
  organic compounds—*contd.*
    naphthalene, solid and liquid states 1266
      octamethylnaphthalene 5785
      nitro- and halogen derivs. 6324
      statistical method 8090, 8791
      low temp. 8798
    coals, X-ray scatt. study 1969
    cupric and chromous acetate, metal-to-metal bo 2086
    chromous acetate, paired Cr atoms 8113
    orthorhombic hexachloroethane 2087
    diethylsilanediol and its hydroxyl groups 2834
    *bis-cyclo*pentadienyl iron 2835
    formic acid 2836
    polyethylene and polyamide spherulites 3703
    gutta percha, 3 forms 3746
    triphenylmethyl bromide 3747
    *iso*nicotinic acid hydrazide 3748
    pyrene, diffuse spots at higher temps. 3749
    histidine hydrochloride monohydrate 3752
    o-iodobenzoic acid 6321
    diphenyliodonium iodide 6322
    diphenyliodonium chloride 6323
    benzene nitro and halogen derivs. 6324
    trichlorbenzonitrite 6325
    2,2-dinitropropane, disorder at room temp. 7293
    tetraphenyl compds. of Si, Sn and Pb 7336
      of Ge and 4th group elements 555
    maleic acid 7337
    β-methylmesityl oxide oxalate 8043
    1-dimensional disorder in $C_{18}H_{24}$ (dodecahyd triphenylene) 8056
    C_2I_4, tetraiodoethylene 8096
    $K(C_2H_5)SO_4$ 8112
    α-pyridone, electron distrib. 8114
    1,2-dichloroethane at − 140°c 8115
    anthracene, statist. method appl. 8791
    Sn tetrapara-tolyl 8799
    oxamide 8800
    horse haemoglobin, polypeptide chains? 8801
      rod-like structures? 8802
Crystallization see also *Crystals, growth; Heat crystallization*
    supersat. soln. film, for cryst. particles detect. 65
    meas. of dielectric props. during 1616
    supercooled water, spont. nucleation, theory 2243
    Ge from melt containing In, distrib. coeff. 4407
    Si, from floating liquid zone 5195
    faces rel. to supersaturation 5772
    supersaturation and impurities, effect on faces 577
    electric charging phenomena 5895
    from solution, theory 6305
Crystallography see also *Electron diffraction crysta graphy; Neutron diffraction crystallography; X-r crystallography*
    X-ray diffract. cameras as optical goniometers 51
    symmetry law, improvements 5767
    CdS, type classification 8758
  mathematical
    principal axis systems, direct-inspection method 5
    so-called homology of crystals 7272
    orientation of crystal plates, transformations 875
    infinite symmetry groups, group theory appl. 876
    generating node between two lattices 8766
Crystals see also *Liquid crystals*
  electron states see also *Colour centres*
    graphite, electronic band structure 344
      momentum distrib. 345
    BN, band structure 346
    under large over-all perturbations 534
    absorption influence on Kikuchi bands and lig dark struct. 899
    metals with pos. Hall coeffs., electron-inertia ex 986–7
    slow electrons in polar crystals, motion 1248, 447
      self energy 4476
    polarons theory 1249, 1630
    free electrons prod. in irradiated alk. halides 125
    m-nitronitrosobenzene, $n \rightarrow \pi$ transition 1515
    Pr and Nd salts, transitions, vibr. struct. 1516
    diamond, electronic structure 2057
    zonal theory, criticism 2058

A complete list of the Subject Headings will be found at the end of the Index.

Crystals—*contd.*
- **electron states**—*contd.*
  - energy bands in metals 2060
  - semiconductor metals, photoelec. emission transition probability 2449–50
  - KCl, electronic *g*-values and *F*-centre wave functions 2546
  - electron trapping states in phosphors 3159
  - ferrous and Zn ammonium sulphates, anomalous spec. ht. study 3270
  - exciton theory 3311
  - Ge, electronic structure 3475
    - drift, mobility temp. dependence 4801
  - perturbed periodic potentials 3480
  - electron in weak periodic elec., and const. mag., field 3717
  - analysis of Nd+++ ion in bromate crystal 4004
  - transitions in ZnS phosphor luminescence 4030
  - PbS electronic band struct. 4241
  - electron motion in non-sinusoidal periodic fields 4474
  - *F*-centre energy levels calc. 4477
  - Brillouin zones det., semiconductors, cyclotron reson. appl. 4805
  - Cu_2O absorption due to low-energy transitions 5389
  - overtone electrons spectrum 5390
  - energy zones in polar crystal 5776
  - overtones in ionic crystals 5779
  - electron levels temp. dependence 5952
  - interaction with lattice vibrations 6980
  - vibrational modifications of electron density 7289
  - 1-dim., square-well potls., band struct. 8053
  - α-pyridone, electron distrib. 8114
  - exchange between adjacent atom *d* shells 8521
- **etching**
  - etch phenomena and Fe_2O_3 (haematite) growth 532
  - thermal, growth invest. 2048
  - etch figures and screw dislocations 2052
  - new chemical etchant 2053
  - metal polycrystals, preferred orientation, simple goniometry 2054
  - etch pits, multiple-beam interferom. study 2055
  - etch-pits and dislocations 3710
    - in lineage boundaries of Ge 5774
  - topaz and carborundum corrosion figures 7286
  - U, thermal etching 8052
  - electrolytic, revealing *p-n* junction 8404
- **faces**
  - different electrochemical potential 2784
- **growth** see also *Crystallization*
  - Ge, rate variation, *p-n* junctions production 229
    - single-crystal, for rectifier 858
    - diamond crystal structure demarcation 1240
    - single crystals, prep. 1244*
    - single crystals, purification and segregation prevention 2809
    - from solns. in Ga and In 4646
    - solute distrib. 7279
    - vacuum furnace for single crystal pulling 8768
  - from vapour, ice, spiral form 531
    - hexagonal metals, Mg, Cd, Zn 1246
    - electron diff. exam. of deposits 7198
    - spiral growth 8763
  - Fe_2O_3 (haematite), etch phenomena 532
  - $BaFe_{18}O_{27}$, high anisotropy ferromag. crystal, from melt 799
  - quartz, interferometric exam. of faces 1238
    - surface layer 8764
  - epitaxial, of Ge on rocksalt 1239
    - chemical, on Zn and Cd crystals 2043
    - alkali halides 2806
    - Ag salts on sphalerite 4470
    - anthraquinone and urotropine on gypsum 5197
    - on talc and CdI_2 5199
    - in polycrystall. metal films 5770
    - platinum on muscovite 7276
  - spiral, on graphite 1241
    - ice, from vapour 531
    - relation to habit, e.g. in apatite 1242
    - relation to symmetry 1243
    - etch figure invest. 2052, 3710
    - from screw dislocations, Ti 2807
    - patterns on salocrystals 2808

Crystals—*contd.*
- **growth**—*contd.*
  - spiral—*contd.*
    - of thymol crystals, soln. and melt 4465
    - beryl and CdI crystals 4467
    - macroscopic, dislocation theory 7280
    - from vapour phase 8763
  - Si, single crystal rods 1245
    - from soln. in Ga and In 4646
    - crystallization from floating liq. zone 5195
  - from solution, 2-dimensional diffusion 2041
    - diffusion problems 4466
    - theory 6305
  - KNO_3, Na enclosure, Na^{22} as indicator 2042
  - CdI_2 from soln., mech. deform. effect 2044
  - Sn, fibrous struct. due to impurities 2046
    - added metallic impurity and closed moulds, effects 3712
    - single crystals 4463–4
  - single and bicrystals, controlled metal solidification 2047
  - invest. by etching and oriented overgrowth 2048
  - partition of numbers theory appl. 2049
  - graphite in cast irons, increasing distortion 2050
  - trypaflavin inclusion in citric acid 2051
  - In single crystals, purity effect 2053
  - synthetic fluorophlogopite mica 2804
  - exaggerated grain growth, W, orientation 2805
  - small ferroelectric crystals 3286
  - imperfect crystals 3648
  - screw dislocations, thin rods 3711
    - spirals from 2807
  - nucleation, review 3714
  - dislocation theory, survey 3732
    - macroscopic spirals 7280
  - Bi, Sn, Zn single crystals, from melt 4463
    - spherical 4464
  - metal whiskers 4468
    - growth theory 8767
    - Cd 2045
    - Pb, Sn, Zn 7274
    - Sn 8050
  - stearic acid, interferom. invest. 4469, 7283
  - preparation of α–U crystals 5193
  - hopper faces, dislocation mech. 5194
  - Ag, growth and slip patterns 5196
  - metal single crystals, special struct. 5198
    - from melt, heat flow 7284
  - snow crystal nuclei 5245–6
  - envelopment of obstacles by growing layer 5768
  - metals, alloys, layer crystals, twins theory 5771
  - faces rel. to supersaturation 5772
  - supersaturation and impurities, effect on faces 5773
  - isothermal, in alloys, theory 6245
  - sheet single crystals of Fe–Si for magnetic purposes 6306
  - ZnO films on Zn 6307
  - ZnO single cryst. with excess Zn 6782
  - preparation for electron microscope examination 7205
  - Al single cryst., method of orientation 7277
  - CdS 7278
    - synthetic, patterns 5769
  - crystallites in $Ni(OH)_2$ sols 7281
  - step height and association in liquid 7282
  - topaz and carborundum corrosion figures 7286
  - cathode deposits, metals, friability 7980
  - Zn and Cd, growth front obs. 8044
  - decomposition in supersat. solns., theory 8045
  - salol, obs. and theory 8046
  - Tl halide mixed crystal inhomogeneity elim. 8048
  - linear film growth in tarnishing reactions 8049
  - AlSb, InSb single crystal prep. 8051
  - U, thermal etching 8052
  - products of mercuric sulphate action in galena 8719
  - martensitic transformation in Co 8765
  - generating node between two lattices 8766
- **imperfections** see also *Colour centres*
  - kink-band concept 533
  - effect on X-ray lattice const. 535
  - quenched-in vacancies and resistance 536
  - Ge grain boundary barriers 845
  - semiconductors, overlapping impurity carriers, energy states 846

- **Crystals**—*contd.*
  - **imperfections**—*contd.*
    - acceptors in Ge by quenching from high temp. 847, 8409
    - transistor electronics, review 854
    - Ge single-crystal 858
    - plastic deform. on cleavage surfaces 1164
    - Si and Ge plasticity 1191
    - rel. between symmetry and growth spirals 1243
    - in hexagonal metal crystals grown from vapour 1246
    - alk. earth compds., impurities effect on X-ray induced absorpt. bands 1538
    - KCl, electric breakdown along 1620, 6759
    - lattice defects, Debye absorpt. study 1623
      - microwave spectroscopy, review 5606
      - distrib. near surface 7298
      - rel. to phase trans. and Debye phenom. 8774
      - Ge, thermally induced, activation energy 223
      - Fe oxides, rel. to microwave absorpt. 5392
      - MgO, rel. to photocond. 7682
      - $Fe_{1-\epsilon}$ (pyrrhotite), structure 8061
    - ZnO defects, h.f. spectroscopy study 1640
    - PbAg alloys, diffusion mech. 1960
    - criterion for onset of slip, metallic polycrystals 1984
    - mech. deformation effect on growth 2044
    - cause of fibrous struct. in metal crystal growth 2046
    - graphite in cast iron 2050
    - CaF_2, causes of thermoluminescence 2369
    - Si, i.r. photoconductivity due to impurities 2462
    - insulating, defects, internal field emission 2478
    - and Co transformations 2755
    - in nearly perfect crystals (book) 2810
    - α-radiation damage in zircon 2828
    - dihalogen benzene, Raman spectrum forbidden lines 3166
    - surface, effect on demagnetization phenomena 3440
    - alkali metals, resist. temp. var., vacancies theory 3632
    - metals, steel rod demonstration model 3647
    - dislocations, theory, review 3648
      - and theory of solids 3732
      - and plasticity (book) 7275
      - single, evap. metal films 1968
      - in work-hardening theory 1991
      - screw, Cd and Sn, and whiskers growth 2045
      - screw, etch figures and holes 2052
      - screw, in thin rods 3711
      - mean shear stress in array 3663
      - and etch-pits 3710
      - equation of motion 4479
      - interaction with boundaries 4480
      - interaction with sound waves 6268
      - interaction with solute atom 8612
      - hopper faces growth mech. 5194
      - structure of lineage boundaries in Ge 5774
      - cold working X-ray scatt. study 6251
      - theory of growth, macroscopic spirals 7280
      - nodes in cubic lattices 7297
      - in anisotropic material, calc. 8058
      - model for demonstrating 8059
      - recurrent, in ReO_3-type structures 8060
      - cubic Co mechanism 8765
    - deformation bands, metallic crystals 3652
      - structure 3659
    - displacements formation 3715
    - ionic movements 3722
    - collapse of vacancy aggregates 3724
    - Ge, solubility and ionizability of impurities 4090
    - Ge, u.s. absorpt. invest. 4666
    - vacancies in lamellae seen in e. microscope 5133
    - thermal migration of liquid inclusions 5192
    - Ag, growth and slip patterns sel. 5196
    - Neumann bands in pure Fe 5736
    - ZnS phosphors, effect on luminescence 5972
    - AgBr, polyhedral sub-structures 6354
    - calcite 6828
    - stacking faults, α-brass, meas. 7215
      - γ–Al_2O_3 8117
    - creep and recovery, review 7221
    - optical goniometer exam. 7271
    - topaz and carborundum corrosion figure interpret. 7286
    - LiF large crystals, X-ray transmission study 7301
    - Cu alloys, anomalous rigidity modulus 7986

- **Crystals**—*contd.*
  - **imperfections**—*contd.*
    - Cu, cold work rel. to Young's modulus 7987
    - diamond, occurrence of slip 8047
    - Sn whiskers, growth 8050
    - Br-graphite, magnetic susceptibility, theory 851
    - grain boundary transition struct. 8711
    - generating node between two lattices 8766
  - **lattice mechanics** see also *Colour centres; Diffu solids; Paramagnetic resonance absorption; So theory; Spin-lattice coupling*
    - piezoelectricity rel. to ferroelectricity and struc 209
    - Cu_3Au, cohesive energy and ordering 343
    - nuclear electric quadrupole interactions 381
      - Al^{27}, spodumene, 2nd-order effects 1845
      - 2nd-order effects 6947
    - acoustic waves polarization 691
    - ZnO absorpt. edge shift with temp. 758
    - cooperative phenomena, statist. mech. treatment
    - graphite, lattice vibrations 991
      - lattice waves rel. to conductivity 2463
    - para-dihalogen-benzenes molec. crystals, limi eigenfreq. calc. 1005
    - polycrystall. media, slow neutron scatt. 1153
    - Franck–Condon principle appl. 1247
    - theory of polarons 1249, 1630
    - effect of size on structure 1267
    - Pr salts, lattice vibrations 1516
      - symmetry of crystal field 6625
    - electronic thermal conductivity, lattice vibra spectrum influence 1571
    - plane and space lattice of similar atoms, ene stability 1797–8
    - zero point energy and θ values 2056
    - charac. temps. and "Debye heat waves" 2063
    - orthorhombic hexachloroethane, lattice energy 2
    - particle wave propag., disordered crystals 2207
    - nuclear magnetic resonance, intensities 2549
      - solid *cyclo*hexane 4267
      - solid H, line shape 7796
      - relaxation, theory 8771
    - electron interactions with vibrations 2580, 6980
    - localized functions, variation procedure 2589
    - Cu_3Au, isothermal ordering rate 2753
    - strong H bonds, stretching frequencies 2798
    - 2-dimensional Ising model, combinational soln. 2
    - dihalogen benzene, Raman spectrum 3166
    - combined pairs of vacancies, Cu 3476
    - 2-dimensional hexagonal lattice statistics, appl. 3
    - Mn ion incorporation in NaCl and KCl 3720
    - ionic movements 3722, 7290
    - successive rotational transitions, theory 3723
    - superlattice stability, Fermi energy effect 3728
    - mixing of states and antiferromagnetism 4205
    - maj. reson. lines, dipolar broadening, magnetic diluted crystals 4217
    - regular binary assemblies, 2nd-neighbour inter 4238
    - latt. vibrations, binary superlattice alloy 4244–5
    - approx. formulae for many-centre integrals 4247
    - Co isotopes, nuclear alignment 4288–9
    - alkali halides, thermal vibr. instability conditi 4471
    - acoust. wave elastic spectrum AgCl 4472
    - singularities in elastic freq., distrib. 4473
    - slow electrons, motion, polar crystal 4475
    - screw dislocation, eq. of motion 4479
    - ionic network macroscopic theory, ZnS Ran spectrum appl. 4734
    - elec. breakdown, directional effects 4824
    - in phys. chem. textbook 5148
    - forces between oriented overgrowth layers on and CdI 5199
    - non-elastic resonance scattering of electrons 5518
    - electrostatic energy of ionic networks 5775
    - molecular theory of Rayleigh scattering 5777
    - interpretation of plastic flow 6270
    - ions in lattices, mutual polarization 6310
    - Si, energy band struct. 6312
    - e.m. wave propag. through plate 6576
    - X-ray propag. through plate 6577
    - light wave propag. through plate 6578

Crystals—*contd.*
  lattice mechanics—*contd.*
    mobility of electrons in polar crystals 6767
    vibrational modifications of electron density 7289
    idealized crystal polarizability, quantum theory 7292
    light absorpt. by trapped electrons 7296
    rotational phase transition, statist. theory 7812
    fluorine-type structure matrices 8054
    NaCl, oscillation frequencies 8055
    outer atomic electrons, space correlation 8057
    transition metals, quantum mech. and group theory appl. 8611
    elastic spectra from sp. ht. data 8772
  orientation
    preferred, effect on $BaO.6Fe_2O_3$ mag. props. 961–2
      simple goniometry of polycrystals 2054
      X-ray det. from spherical specimen 5783
    in Ge film growth on rocksalt 1239
    Ag, from, halide layers decomp. 1966
    chem. growth on Zn and Cd crystals 2043
    growth invest. by oriented overgrowth 2048
    trypaflavin inclusion in citric acid 2051
    In single crystals, det. 2053
    in W exaggerated grain growth 2805
    HgCl electrochemically formed on Hg 3713
    Bi single crystal, light-figure method 4462
    α-U crystals 5193
    alkali halides on mica 5200
    vapour deposits, electron diff. exam. 7198
    optical goniometer exam. 7271
  twinning
    in sodium niobate 550
    Zn, accommodation kinking 2803
      plastic deformation 3709
      compensation method invest. 7322
    Neumann bands in pure Fe 5736
    in growth of metals, alloys, layer crystals 5771
    β-methylmesityl oxide oxalate 8043
    Pb titanate domains 8761
    deformation twins 8762
Current, electrical see also *Conduction*
    current densities of cathode spots on Hg 870
    d.c. microampere integrator 1628
    flow in cylinders 2441
    single-wire transmission line theory 2556
    acousto-electric effect 3066
    induction in disk by mag. pole creation 4221
    establishment in nonhomogeneous medium 4794–6
    current element near conducting half-plane edge 6964
    oscillations in homogeneous flow of electrons 6966
    diffusion, in semiconductor Hall effect 7671
    electron collisions in ionized gas and conduction current 8478
Curvature measurement
    small radii, with light-profile microscope 1401
    bending of optical flats 2973
    spherometer measurements, accuracy 4628
Cyclohexane
    vapour, refractivity 726
Cyclotrons see *Particle accelerators*
Damping see also *Elastic losses*
    "damping principle" and forced oscill. problem 83
    oscillating sphere in viscous fluid 1445
    in vibrating rods, meas. 1997
    turbulence, by magnetic field 2991
    attenuation in the shock tube 3043
    thermal, of elastic vibrations 5928–9
    oscillating quartz in liq., rel. to viscosity 7533
    internal, of initially stressed medium 8299
Data tables see *Collections of physical data; Tables, mathematical*
Dating see *Earth, age; Radioactivity, dating*
Decay periods, schemes see *Radioactivity*
Decomposition see *Dissociation*
Deformation see *Bending; Elastic deformation; Plastic deformation*
Demagnetization
    powdered paramag. salts diluted with He 190
    rel. to anisotropy in magnetic recording tape 965
    Cr alums, low temp. 1573
      adiabatic, of $CH_3NH_3.Cr(SO_4)_2.12H_2O$ 6949
    adiabatic, and temp. scale below 1°K 1589
    coercive field, magnetic matls., theory 4218

Demagnetization—*contd.*
    mag. electron lenses, remanence in soft Fe circuits 4847
    demagnetizing field effect on mag. viscosity 5576
    non-uniformly magnetized specimens, retentivity det. 6147
    cyclic, adiabatic 6148
    adiabatic, low temp. prod. apparatus 8376–7
    thermoremanent magnetization, fine powders 8580
Densitometry
    apparatus for converting photometric meas. to blackening 102
    micro-, modified spectrophotometer appl. 110
      recording, for biological use 5371
      micro-reflex 6356
      direct-reading 8306
    u.v. papyrography appl. 2040
    isophotal contour densitometer 2309
    step wedge for direct sensitometry in elec. microscope 4415
    photoelec. densitometer 5372
    Ag^{107} neutron activation as alternative method 6361
    Callier effect., invest. 8158
    grain density in nuclear emulsions 8167
    particle tracks in photographic plates 8304
    cuvette densitometer for cardiac output det. 8821
Density
    in earth's central core 8805
  gases
    Kr, weight of a litre 75
    He 1586
    Xe, vertical distrib. near crit. pt. 3245
    upper atm., from rocket data 3769
    UF_6 0°–100° 4634
  liquids
    liq. F, rel. to temp. 1404
    supercooled liq., discontinuities 2242
    UF_6 65°–100° 4634
    liquid ozone 5318
    supercooled H_6O and D_2O 5319
  solids
    CdO sputtered layer 224
    synthetic graphite, closed pores effect 3633
    Ni–Mn alloys, influence of heat-treatment 4399
    Polythene, effect of cross-linking 4455
Density measurement
    protein crystals 529
    concrete slabs, γ-radn. method 1099
    gases, magnetic balance 2224
    upper atm., rocket method 3769
    heavy water in low conc. 4630
    liquids, low temp., manometric method 5318
    liquids, remote meas. 6504
    aq. ionic solutions, r.f. method 7484
Detonation see also *Explosions*
    liquid and solid explosives 503
      explosion initiation (book) 2780
      theory 5154
    spinning, in CO–O_2 mixtures 504
    examples of weak detonations 1209
    in condensed systems (book) 2003
    non-ideal waves, flash X-ray invest. 2005
    photog. records, angle comparator exam. 2223
    velocity, rel. to tube diameter 3683
      meas. by microwave reflection 5153
    proton gas 4347
    acetylene/air mixtures, limits and velocity 7236
    pentaerythritol tetranitrate, kinetic theory appl. 8734
Deuterium
    pos. meson production by photons 1146
    Verdet const. det. 1792
    refract. index at 9200 Mc/s 3455
    rel. abundance in steam wells 4297
    abundance in solar atm. 4564
    ortho- and *para-*, low temp. viscosity, difference 6511
Deuterium chloride
    bond lengths, etc., from i.r. spectra 6639
Deuterium oxide see *Ice; Water, etc.*
Deuterons see also *Nuclear reactions, deuterons*
    ground state, and nuclear forces 48
      momentum space wave functions 5866

A complete list of the Subject Headings will be found at the end of the Index.

Deuterons—*contd.*
- bombardment effects, damage and recovery of Cu, Ag, Au, Ni, Ta 216
  - on Cu creep rate 1194
  - fluorescence in KI(Tl) 8338
- photomeson production 448–9
- deuteron stripping reaction 2696, 3585
  - (*d*, *p*), invest. for Al 3592
  - (*d*, *p*), invest. for Mg isotopes 3593
- in Kodak NTB emulsions, range-energy rel. 2882
- photodisintegration 3596
  - photomag. and photoelec. cross-sections 4359
  - at 20 MeV, proton ang. distrib. 7932
- mag. moment, relativistic corrections 4278
- meso-disintegration, strong coupling theory 4340
- neutron scatt., diff. and total cross-sections 4364
- radial eq., asymptotic eigensolutions 4619
- Cu bomb., elect. resistivity increase 5608
- from $Be^9(p, d)Be^8$, ang. distrib. 5701
- relativistic eq., 2nd quantization and config. space appl. 6459
- high-energy, in cosmic rays 7758
- **scattering** see also *Protons, scattering*
  - Univ. of Pittsburgh scattering project 270
  - elastic, Coulomb, Rutherford formula departure 437, 2703
  - elastic, by tritons 438
  - 10 MeV, elastic, by H^3 and He^3 1114
  - *d-d*, elastic, at 10·5 MeV 1115
  - elastic pion-deuteron scattering 5105–6

Development, photographic see *Photographic process*

Diacetylene
- thermodynamic properties 196

Diamagnetism see also *Magnetic properties*
- anisotropy of complex aromatics, calc. 326, 6955
- surface, number theory appl. 949–50
  - of enclosed electron gas 4199
- electron gas susceptibility, small effective electron mass 2551
- Landau, surface corrections 3421, 8511
- of free electrons 3422
- low temp., of electrons in cylinder 6805
- of quasi-bound conduction electrons 6930
- oxides susceptibility, reduction by neutron bombard. 6956
- effect of Br on graphite susceptibility, theory 8513

Diamonds
- opt. and elec. charac. (book) 234
- Compton radiation spectrum 1090
- slow neutron scattering, energy distrib. 1154
- abrasion hardness props. interferom. invest. 1995
- energy band structure 2057
- colour centres 2062
- unusual phosphorescence 2373
- polished, interferometric surface exam. 2384
- electronic structure 5202
- specific heat, etc., at low temp. 5446
- electronic conductivity rel. to density var. in melting 6033
- coloration and luminescence (book) 7295
- slip, occurrence in twin crystal 8047
- absorpt, spectrum, reversible bleaching of band 8062
- elastic const. by diffuse X-ray reflection 8066

Dichroism see *Pleochroism*

Dielectric constants of substances
- **gases**
  - A, at 9700 Mc/s 2437
  - vapours adsorbed on silica 4453, 5180
  - refract. index of mixtures, dm wavelengths 6031
- **liquids and solutions**
  - seawater, high freq. 833
  - water films, abnormally low 1607
  - solutions of charged particles 1610
  - *n*-primary alcohols 1615
  - nitrobenzene and *o*-nitrotoluene mixt. with benzene 3194
  - polarizations, alcohol mixtures 3288
  - dil. solns. water and ethyl alcohol in dioxan 3467
  - water/ethyl alcohol mixtures 4076
  - organic, relax. time rel. to association 4786–7
  - hexane and solutions 5453
  - complex, at 9500 Mc/s 5464
  - ordinary and heavy water, calc. 6030

Dielectric constants of substances—*contd.*
- **liquids and solutions**—*contd.*
  - Green's "correction" to Yvon's formula 6751
  - dil. suspension of membrane-covered ellipsoids
  - relaxation in glycerine 6754
  - polar liquids theory 7655
  - carboxylic acids, self-ionization phenomenon 76
  - EtOH, NaCl, at u.h.f. 7660
  - ionic solutions, concentration dependence 8388
  - relaxation in ethanol below −147°c 8391
- **solids**
  - 2 chlorine-methyl substituted benzenes and p iodobenzene 210, 7659
  - relaxation in *d*-camphor 211
  - phosphates, at 9500 Mc/s, rel. to temp. 831
  - and loss angle, silicate glasses, rel. to comp. 834
  - dipolar substances, frequency dependence 1608
  - long-chain aliphatic alcohols, temp. depend 1609
  - 6 tetrasubstituted methanes, dispersion 1612
  - during precipitation 1616
  - KCl crystals 1620
  - synthetic mica 2804
  - metal powder in paraffin wax 3291
  - NaCl crystals with Ca and Mn impurities 3293
  - KCl and NaCl, elec. strength temp. rel. 3342
  - SeF_6, dielec. strength 4074
  - Mg, Cu, Co, Ni, Mn ferrites, microwave 4079
  - semiconducting aggregates, e.g. Mg ferrites 4 7661
  - ice, anisotropy 4789
    - statist. mech. calc. 6030
  - ammonium phosphate and arsenate isomorp specimens 5458
  - hydrobromic acid, 10 000 Mc/s 5459
  - moist cork, dissipation factor anomaly 5463
  - complex, at 9500 Mc/s 5464
  - crystals of high elec. strength 5493
  - electroluminescent powder changes during illum tion 6666
  - effective const. of solid mixtures 6750
  - proteins at cm wavelengths 6753
  - alkaline phosphates and arsenates, transition po 6755
  - ZnO, rel. to u.v. illumination, ferro-elec. and ther luminescence 7583
  - dry soil, u.h.f. 7660
  - **ferro-electrics**
  - WO_3 207
  - $BaTiO_3$, domain properties 208
    - ceramics containing $CaTiO_3$, Y_2O_3, PbT improved temp. stability 832
    - ceramic, hysteresis loops, h.f. 1613–14
    - single crystals 4788
    - metastable states 5454
    - effect of varying composition 5457
    - prepolarized, loss 6562
    - double hysteresis loop, Curie point 7654
    - (Ba: 80%, Sr: 20%) TiO_3, 3000 Mc/s 8390
    - 120°c transition 8392
  - ferroelectricity rel. to piezoelectricity and cry struct. 209
  - sodium niobate 550
  - new TiO_2 dielectric matl. 830
  - $ND_4D_2PO_4$ (deuterated ADP), antiferroelec transition 1236
  - tetragonal antiferroelectric crystal (deuterated A 1237
  - $Cd_2Nb_2O_7$, $Pb_2Nb_2O_7$ 1611
  - KH_2PO_4 4073
    - transition, X-ray analysis 6756
    - colloidal crystals 8387
  - expl. of origin in perovskite crystals 6757
  - ceramics, near Curie point 6758
  - K and Na niobates, elect. hysteresis 6981
  - $PbHfO_3$, antiferroelec. 7656
  - Condensa and Epsilan, mm-wave 8320
  - Sr titanate, rel. to temp. and freq. 8389

Dielectrics see also *Breakdown, electric*
- research and development, digest 828
- relaxation in glycerol, rel. to ultrasonic relax. 14
- Clausius–Mosotti eq. for anisotropic crystals 160
- ferroelectricity in fluorite-structure oxides 1611

ielectrics—*contd.*
- $BaTiO_3$, h.f. hysteresis loops in ceramic 1613–14
  - character of higher transition 5455
  - polarized rectifying property 7653
- wood, loss factor behaviour in h.f. range 1624
- high-voltage polarization rel. to elec. field strength 1643
- solutions, polar ion electric polarizability 2438
- research on ferroelectric matls. 3286
- plastic electrets 3287
- dipole loss in polystyrene and derivs. 3292
- crystall. matl. l.f. loss, increase on grinding 3294
- organic liq., breakdown strength study 3341
- high-ε cavities, quasi-degenerated modes 3448
- props. of two-body systems 4072
- Ge electrons collision freq., microwave det. 4077
- ferroelectricity in face-centred cubic struct. oxides 4078
- l.f. dispersion in Ni- and Co-ferrites 4081
- polarization field and reson. freq., alkali halides 4082
- ferroelec. Rochelle salt and KH_2PO_4, domain struct. 4481
- thermal conductivity, low temp. 4757
- ferroelectricity (book) 4785
- loss angle in crystals, temp.-freq. dependence 5462
- vac. microbalance for sorption meas. 6501
- lattice defects in solids and radiowave spectra 6760
- radioactive charging through dielec. medium 6848
- dielectric tensor, ionized layer, crossed fields 6974
- thermal effects and losses, rel. to polarization and dipole moments 7021
- dispersion, water vapour on silica gel 7652
- phase transitions in antiferroelec. $PbHfO_3$ 7656
- cyclohexanol, low-temp. behaviour 7657
- polarization and self-ionization, carboxylic acids 7658
- h.p. polarizability-changes, rel. to diamag. suscept. changes 7662
- solids, low temp. props. (book) 8366
- temp. meas. in h.f. fields 8378
- single crystal directional dielec. breakdown 8438

measurement
- liquid dielectrics, cell 829, 1622
- during precipitation 1616
- hyperbolic tangent method, rapid calc. 1621
- condenser discharge method criticism 3289–90
- metal powder in paraffin wax, waveguide microwave method 3291
- Debye type losses in NaCl crystals with impurities 3293
- solutions, accurate 4790
- high-loss liquids, microwave calorimeter appl. 4936
- complex const., hyperfrequency region 5460
  - cm wavelengths 5464
- solid dielecs., ultra-short and dm region 5461
- superconductors, from surf. imped., h.f. field 5483
- optically uniaxial crystals, cavity resonator method 5581
- permeability in cm range 6028
- const. and loss angle, semiconductors 6032
- EtOH, NaCl, soil, at u.h.f. 7660
- Ba, Sr titanate permittivity, 3000 Mc/s region 8390

theory
- benzene solid state derivs., appl. 210, 7659
- benzene derivs., solid state, behaviour 210
- polarization, of polar liquids 827
  - fields, and dispersion formulae 1604
  - extrapolation formulae 1606
  - liquids 5453
  - in polar substances 6030
  - polar gases, rel. to intermolec. potl. 7819
- molecular and ionic reactions, survey 828
- dipolar substances dielec. props. freq. dependence 1608
- $BaTiO_3$, static model at room temp. 1617
  - with covalent Ti–O link 5456
  - Curie point double hysteresis loop 7654
- modern theories, review 1618–19
- Poisson–Kelvin hypothesis 2434
- isotropic artificial dielectric, boundary effects 2435
- relaxation, in dipole liquids 2436
  - time, and internal field 4075
  - dipole, fundamental formalism 4791
  - time, polar molecules in solution 7651

Dielectrics—*contd.*

theory—*contd.*
- "admittivity" of isotropic body 3445
- granular semiconducting aggregates dielec. behaviour 4080, 7661
- artificial dielectrics, Schrödinger's eq., propagating solns., variational methods 4940
- ferroelectrics, analogies with ferromagnetic matls. 6029
- reaction field of a noncentral dipole 6165
- electrostatics rel. to crystalline dielect. consts. 6744
- thermo-dielectric effect 6761–2
- artif. lattice, theory of wave prop. 6972
- "photo-dielectric" effect in ZnO 7583
- dielec. const. theory polar liquids 7655
- electron multiplication in insulating crystals 8439
- Debye phenomena rel. to lattice defects 8774

Differential analysers see *Calculating apparatus*

Differential equations
- linear hyperbolic, integral variants assoc. with 1327
- setting up on differential analyser 2137
- traffic dynamics operational anal. 2893
- nonlinear, solution by reversion methods 2894, 6377
  - analogue computer solving unit 2898
  - reducible, occurring in mechanics 4552
- heat eq., elementary soln. 2895
- wave eq., formulae for numerical integration 4553–4
- of heat conduction, Picone procedure appl. 5433
- Mathieu–Hill type, matrix soln. 6373
- diffusion type, soln. 7439

relaxation methods
- 2nd-order, integration and iteration methods, combination 4837
- unitary operator $U(t, t_0)$ iteration eval., convergence 6378

Diffraction
- shutter problem, diffraction in time 632
- variational methods in diffraction theory 5288

acoustic waves
- on a sphere, rel. to reciprocity theorem 89
- finite grating, multiple scattering, Wood anomalies 167
- shock wave, by right-angled wedge 690
  - strong, flow field 2265
- removal of inconsistency in theory 1464
- by apertures, meas. and theory of circular 3062
  - infinite matrices assoc. with 8296
- pulses, by oscillating strip 3955
  - by non-rigid screen 3956
- by thick semi-infinite plate 4924
- patterns for solid delay lines 5347
- by rough surface, theory 5421
  - application 5422
  - "statistically rough" surface 5423
- plane waves, by paraboloid of revolution 5927

electromagnetic waves
- multiple scattering by finite grating 167
- exact theory, unicity of solution 331
- pulse, by right-angled corner 690
- book notice 980
- by orifice in conducting screen 981
- wave eq. in hyperbolic space 1413
- removal of inconsistency in theory 1464
- by holes in plane sheets 1773
- by aperture in infinite screen 1776
- diffraction field of circular aperture 1778, 2563
- new method of solving problems 1779
- in circular apertures <1 wavelength dia. 2565
- by plane grating, general solution 3452
- by an edge and a corner 4226
- cm region, patterns calc., optical method 4923
- by thick semi-infinite plate 4924
- radiowaves, by earth's curvature 4931
  - by the earth, tables of functions 4932
  - by mountains, theory 8590
- by rough surface, theory 5421
  - application 5422
  - "statistically" rough surface 5423
- microwave lenses, astigmatic diffract. effects 5587
- at slit, rigorous treatment 6154
  - intensity and polarization, "magnetic case" 8589
- pattern for filament in presence of conducting plane 7799

Diffraction—*contd.*
  electromagnetic waves—*contd.*
    of dipole field by half-plane 7801
    recent developments, survey 7802
    conducting disk and circular aperture 8588
  electrons see *Electron diffraction*
  light
    textbook 98
    by ultrasound in liquids, visible by phase contrast 163
      intensity variation patterns, different liquids 2388
      u.s. dispersion in esters appl. 3944
      angular dependence 4743
      u.s. velocity meas., appl. 6554
    multiple-slit pattern 164
    diffraction microscopy, X-ray focusing appl. 174
    by finite no. of centres, random distrib. 2385
    Zernicke circle polynomials 2386
    Mie theory, interstellar matter and atm. aerosol appl. 2387
    diffraction images in annular aperture systems 3087
    at spectrometer slit, effect on line intens. 3099
    random sets of circular apertures 3181
    super-resolving pupils 3182
    pattern due to circ. aperture half covered 3183
    Hopkins's X_n and Y_n functions 3184
    3-aperture system figure 4043
    partial coherence and transmission functions 4044
    parageometrical optics extension to curved suface 4677
    optical images theory 4688
    optical-diffract. methods in X-ray anal. 5209, 7316–17
    perturbation in region surrounding slit 5419
    "enlarged pinhole," light distrib. 5420
    by rough surface, theory 5421
      application 5422
      "statistically rough" surface 5423
    by ice crystals in sky 5811
    asymptotic treatment, rel. to geom. optics 5939
    instrumental, theorems and their application 6672
    spherical vector waves by inf. half-plane 7610
  neutrons see *Neutron diffraction*
  X-rays see *X-ray diffraction*
Diffraction gratings
    high resolving power echelle spectrograph 109
    monochromators, single or multiple, slit curvature 112
    multiple-slit theory appl. 164
    concave, successive diffractions 165
    ruling engine adjustment, replica technique 166
    finite, multiple scattering, Wood anomalies 167
    appl. as optical filter 765
    anomalies theory 781
    plane, arranged for double-pass spectrograph 1491
    increased efficiency by Pt coating 1497
    wire, parallel pair, interferometer action 1560*
    helical rulings generation for plane gratings prep. 2389
    phase contrast studies, quality control 3220, 6674
      periodicities anal. 3221
      meas. of structure 5424
    practical text-book 4042
    efficiency, vac. u.v., improvement by platinizing 4695
    alternative to Rayleigh's treatment 5983
    transmission echelon, resolving power 6673
    plane, replicas from helical rulings 6675
    Wadsworth mounting 8345
Diffusion see also *Neutrons, diffusion*
    interferometric meas. of diffusion constants 159
    cross-sections for metastable atoms 1706
    probability of two molecules colliding 3028
    flux, Onsager's rel. not appl. 4066
    heat and matter, variational principles, appl. 6740
Diffusion, gases see also *Flow, gases; Permeability, mechanical*
    n-pentforane and *n*-pentane mixtures 70
    n-butforane mixt. with *n*-butane 71
    CO_2–CO_2 and CO_2–N_2O, intermolec. potentials det. 349
    and intermolec. force 658
      self-diffusion coeff., calc. 82
    diffusional growth process, aerosol particles 1225*
    vapour, in gas, rate 1425
    He through zircons, mechanism 1426

Diffusion, gases—*contd.*
    thermodynamical treatment 1596
    quantitative expression of mixing, gases 2249
    leak-locating tracer-gas in ground 2682
    in porous catalysts 3014
    air in water, bubble method 4649
    mixture due to turbulence 6533
    in CH_4–TCH_3 system, to 300 atm. press. 7504
    I^{131} vapour, on to surfaces in airstream 8269
    anomalous, acetone into cellulose acetate 8271
  thermal
    isotope separation, column efficiency improveme
      in Knudsen- and Poiseuille-flow transition 1040
      in critical region 2251
      column, Drickamer's modfn. of theory 2252
    thermal transfer theory, reacting mixtures 794
    intermolecular forces, unlike molecules in mix 3015, 6986
      derivation of intermol. force consts. 3483, 56
    theory and expt. (book) 4648
    H_2–N_2 mixtures, ultrasonic method 8270
Diffusion, liquids
    Hg self-diffusion 64
    acetone into polyvinyl acetate, sorption kinetics
    in crystal growth from soln. 2041, 4466
    transport processes theory 2239
    pressure effect, on self-diffusion in CS_2 2248
      in CS_2 organic mixtures 3922
      in water and sulphate solns. 3923
      in aq. and alcoholic salt solns. 3924
      in CCl_4–SnI_4 7495
      in liq. S 7497
    elec. charges formed, rendering visible 3007*
    with sharp moving boundary 5326
    in sound prop. in liq. He II solutions 5444
    in fluid flowing through tube 6530
    dichlorethane in polystyrene 6531
    conduction and viscosity interpret. 6532
    mixture due to turbulence 6533
    in electrolysis, theoretical review 7242
    in binary systems 7493
    liq. S, rate invest. 7496
    polymers in soln., rate rel. to conc. 7499
    accompanied by Langmuir-type absorpt. 8266
    effect of ultrasonics 8267
    macromolecules in suspension 8628–9
  measurement
    solutions, rapid determination 3006
  thermal
    in heavy water 2247
    H_2O, thermal conductivity theory 4051
    in presence of temp. grad. and chem. reactions
    short survey (book) 4648
    in sound prop. in liq. He II solutions 5444
    in binary systems 7494
Diffusion, solids see also *Permeability, mechanical*
    Kirkendall effect in Cu brass 480
    processes determining oxidation rate of alloys 48
    energies for formation and movement of vacan 536
    Ge, self-diffusion "activation energy" 847
      diff. const. rel. to electron and hole mobility
    graphite, self-diffusion mechanism 1169
      C^{14} study 1170
    Ag self-diffusion, cyclotron bombardment effect
      impurities effect 1960
      high temp. deformation 1982
      at surfaces 7195
    substitutional solid solns., porosity development
    C in Ni, solubility and diffusion coeff. 1174
    ions through metallic coatings 1215
    Sb in Ag single crystals, meas. 1959
    H, through Ni plate, mech. 1961
    metallic, entropies of activation 1962
    self-diffusion in polymers, rel. to viscous behav 1963
      measurement 1965
    polygonization during 1964
    Si, in Ni 2477
      in Fe 4404
    variable coeffs., analytical calc. 2751
    importance in sintering powders 3628

ffusion, solids—*contd.*
- in metals, review 3630, 7969
- metals, coeffs. det., rel. between methods 3631
- self-diffusion in alkali metals 3632
- self-diffusion in $CaO.Fe_2O_3$ 4402
- radioactive Fe in Fe oxide and Zn–Fe spinel 4403
- self-diffusion in $BaTiO_3$ 4405
- Na in NaCl, X-ray invad. effect 4406
- O ion diffusion in Fe oxide film 4456
- K^+-ions in KCl crystals 4799
- self-diffusion in PbO 5121
- D_2 from D_2O, through steel 5122
- Cs^{137+}, in NaCl single crystals 5160
- determination of $D = D_0 + \alpha C$ 5726
- impurity diffusion in "fused-impurity," *p-n* junctions 6049
- single- and multi-phase, in alloys, coeffs. eval. 6246
- oxide layer flow during Cu oxidation 6247
- partial coeff. rel. to collective, metallic mixed crystals 6248
- S ions in AgBr, high temps. 6943
- Li, into Ge and Si 7196
- oxide-coated cathode, Ba diffusion 7748
  - theoretical study 7749
- $Na^{22, 24}$, isotope enrichment in elec. field 7853
- self-diffusion in compressed metal powders 7967
- coeff. rel. to interatomic interaction, metals and alloys 7968
- effect of plastic deformation 7970
- in supersat. solid solutions 8045
- Ag into Te, in Te/Ag thermocouples 8381–2

ffusion, light see *Reflectivity; Scattering, light*

imensions see also *Units*
- and units, theory 15
- M.K.S. system advantages 591
- dimensional analysis in general physics 592
- dimensional analysis contractions 1601
- electro-mech. unit systems 3845
- dimensionless secondary quantities 4580
- primary Pfeifenton freq. relationships analysis 5906
- dimensional analysis (conference report) 6440
- consistent unit of temperature 6692
- dimensional analysis and similarity (book) 7411

iodes see *Electron tubes*

ischarge tubes see *Electron tubes; Gas discharge tubes; Ion sources; Particle accelerators; X-ray tubes*

ischarges, electric see also *Arcs; Breakdown; Corona; Counter tubes, discharge; Sparks*
- in gases (conf.) 246
- condensed, in Xe and Kr, emitted radiation wavelengths 250
- spark, l.p., shock waves 251
- cathode spots on Hg, current densities 870
- l.f., irradiation effect on, press. change and rise 873
  - electrodeless, photoionization importance 3331
  - conductivity rel. to Langmuir adsorption 7698
  - electrodeless, secondary processes 7702
- brush, ionization density in dielectric 877
- MgO field-dependent emission 904
- Joshi effect, in I vapour ozonizer tube 1656
  - neg., and "corona press." 4122
  - pulses, Siemens ozonizer 4129
  - rel. to electronic part of current 6821
  - surface layer theories, limitations, review 7699
  - time lag 7700
  - analogue with thermo-electrons 7701
  - pos. and neg., effects of ageing 8433
- CO_2, methane, ethane, propane, propylene, H_2O, air, i.r. molec. emission 1663
- l.p., in air and N_2, Crookes dark space field 1664
- Hg green continuum enhancement by rare gas 1665
- field emission, space charge and vacuum arc 2479
- Cs, in mag. field, spectroscopic study 3097
- mag. fields in moving plasma 3324
- strata formation 3325
- ball of fire, with current saturation 3333
- glow, general review 3336
  - d.c., electron density distrib. 253
  - chem. reactions caused in pos. columns 3334
  - NH_2–NH_2 and NH_3 in 6823
  - neon, effect of microwave pulses 8432
  - positive column, in air, A and N, electron energy distrib. 8435

Discharges, electric—*contd.*
- glow—*contd.*
  - canal ray spectra 8436
  - glow to arc transitions, cathode surface effect 8437
  - treatment of metals, electron emission 8482
- cathode rays, energy spectrum 3337
- spark line prod. in He, air and A 3338
- l.p. Hg, u.v. and fluoresc. efficiency 3339
- field emission of electrons 3345
- plasmas, generalized ionization formula 3390
  - in rarefied gas, variable current 3335
  - rotating and generating mag. fields 8428
- effect of transverse mag. field 4120
- gases, shot noise calc. 4127
- method of increasing photog. sensitivity 4545
- flash-disch. tube for Lyman continuum prod. 4752
- neg., pre-breakdown, air, for impulse voltages 4819
- voltage gradient in Hg vapour pos. columns 4823
- transient in Hg arc 5485
- conditions for natural oscillations and layer movements 5490
- in transverse mag. field, breakdown voltages for 10 to 10^{-8} mm Hg 5491
- quenching of afterglow by microwaves 5492
- "electronic pump" obtaining high vacuum 5897
- in mag. field with special gap config. 6065
- Hg afterglows, processes involving ions and metastable atoms 6067
- silent, a.c., streamer mechanisms 6817
- high-energy, due to neutron synthesis and decay? 7182
- occurrence in astrophysical systems 7386
- gas, electron and +ion energy meas. 7693
- hydrocarbons, chemical reactions 8021
- comprehensive review 8427
- gaseous, formation mechanism 8430
- in crossed electric fields 8434
- **high-frequency**
  - microwave phenomena in gases 124
    - d.c. flow 1661–2
  - electrodeless, metallic vapour lamps 176
    - in superimposed mag. field, resonance effect 872
    - water vapour, OH and OD rotational intensity distrib. 3143
    - growth 6822
  - in gases (conf.) 246
    - review 3330
  - breakdown in Ne 252, 6814
  - r.f. oscillations in a.c. silent discharges 254
    - heat effect on freq. 4124
    - light effect on freq. 4822
  - plasma-like oscillation, frequencies 255
    - transit time tubes 1667
  - electron removal in Kr afterglows 871
  - in He, collisional processes and similarity 1655
  - electron temp. and field strength, probe meas. 1666
  - e.m. properties of plasmas 1668
  - Hg vapour, microwave radn. absorpt. and reflect. 1774
    - microwave admittance 1775
  - electron density and collision freq., microwave absorpt. meas. 2473
  - Joshi effect, pulses in water vapour 4123
    - in ozonizer tubes, mech. 4125
  - new electron multiplication process 4128
  - between plane plates, low voltages interpret. 6068
  - comprehensive review 8427

Disperse systems see *Aerosols; Colloids; Emulsions; Foams; Powders; Sols*

Dispersion, acoustic
- in slightly non-homogeneous medium 85
- in mixtures of gases 675
- translational, in monatomic gases 677
- and radiation pressure 2287, 6571
- magnetic, in elec. conducting plates 6570
- **ultrasonic**
  - in methyl chloride 1455
  - in *cis*- and *trans*-dichloroethylene vapours 1457, 5915
  - internal, in liquids 3000
  - in fluids, rel. to molec. motion 3001
  - in esters, light diffract. method 3944
  - of pulse in tube 5346
  - in $MgSO_4$ water solutions 5914
  - in sodium acetate solutions 6555
  - in compressed gases 7523

A complete list of the Subject Headings will be found at the end of the Index.

Dispersion, acoustic—*contd.*
 ultrasonic—*contd.*
  influence of an alcohol/water mixture 8282
  in organic liquids 8283
  in halo-methane vapours 8289
Dispersion, optical see also *Refractive index*
  standard air, formula 4690
  of a 980 : 222 glass 5940
Dissociation see also *Heat of dissociation; Ionization; Molecules, dissociation*
  vinylcyclohexene, kinetics 500
  S vapour, spectrophotons, invest. 1206
  H_2 and N_2 on W filaments 2779
  methyl siloxanes, by electron impact 3389
  mass spectra of tetramethyls 3393
  H_2O_2 by electron impact 4886
  energies, Hg–C bonds 7262–3
  H_2, solubility in liq. metals 7502
 electrolytic see also *Ions, electrolytic; pH*
  consts. det., some fatty acids 2781
  ethylene diammonium and hexamethylene diammonium ions, 0° to 60°c 2782
  hydroferrocyanic ion in aq. soln., kinetics 3686
  molten $LiBO_2$ 7492
  iodine-pyridine complex 8736
Distillation see also *Isotope separation*
  isotope separation, as rectification problem 2627–8
   fractionating columns optimal flow 523
   fractional, H_2O^{18} separation 3707–8
   fractional, approach to equilib. 7055
   water, steel gauze ring packing performance 7056
   in organic liquids 7854
  vacuum, relative volatility at different rates 3021
  behaviour in vacuum pot still. 3022
  comparison of high-vacuum stills 3023
Doppler effect
  for 4·5 and 4·8 MeV γ-rays 1088
 light
  in modified Newtonian systems 1365
  rel. to spectroscopic resolving power 1494
  spectral line width, collision effect 2334
Dosimetry see also *Radiation monitoring; Radioactivity measurement; X-ray measurement*
  film, β-radiation meas. 1079
   radn. quality and devel. procedure, influence 2643
   conference report 4535
   calibration 5522
  β-rays, in homogeneous substances 1886
  dosimeters, X-ray calibration 2640
  chemical, for X-rays, at high rates 5758
   tracers appl. 5826
  β dosage det., by ionization measurements 6348
  X-rays, vacuum CdS cell 6792
  automatic isodose recorder 7108
  of kilocurie Co^{60} source 8649
  pile radiations, differential oxidation of Fe^{2+} 8743
Double refraction see also *Electromagnetic wave, propagation; Optical rotation; Photoelasticity; Polarized light*
  white light, interference, transparent objects observation appl. 780
  method for fatigue invest. in rock salt 1993
  birefringent objects, phase contrast and interference microscopy 3219
  contrast increase by sensitive colour, in microscopy 3225
  due to u.s. beam, direct viewing appl. 3952
  stearic acid crystals 4469
  interference, cathode- and X-rays, by crystals 4825
  cellophane, in visible spectrum 7618
 electric see *Electro-optical effects*
 flow
  instrument for study 1563
  size distrib. of rod-shaped particles 4748
  high polymer conc. soln. 5316
  particles in suspension 8629
 magnetic see *Magneto-optical effects*
Drops
  in clouds, growth by condensation 566–7
   sampler for aircraft 4496
   stratiform, rain-drops coalescence 4504
   surface tension 5892
   charged, development above freezing level 7365
Drops—*contd.*
  evaporating liquid, vibrations 670
   into a gas stream 1581
  nucleation, probabilities on solid surfaces 1416
  sprays, protection against heat radn. 1575
   size and distribution calc. 6524
   uniform drop size, hypodermic needles 6525
  light scattering, ang. distrib. 2390
  supercooled, study 3013
   influence of volume 4763
  rain, coalescence in stratiform clouds 4504
   evap. while falling 4506
  electric charge, meas. 4516
  production by electrical atomization 5175
  salt soln., temp. of co-existence with ice crystals, at
   5243
  spreading by elec. field 6520
  liq., theory of shattering 7355*
Drying
  intense, of gases, with K 3705
  herbage, by r.f. dielec. heating, laboratory 3706
  differential thermobalance 8249
  industrial drying agents, test apparatus 8746
Dusts see *Aerosols; Powders*
Dynamics see also *Ballistics; Elastodynamics; Ki*
   matics; Rotating bodies; Vibrations
  closed differential pulley, teaching app. 2214
  of traffic, operational analysis 2893
  impact energy absorpt. by pulverization 3892
  linear elastic stability, critical analysis 6496
 rigid bodies
  rod, longitudinal vibr., Laplace transform appl. 38
Dynamometers see also *Force measurement*
  for human calf muscles 570
Dysprosium
  metallic, mag. props. 4904, 7792
  thermal expansion anomalies 7624
  some magnetic and elec. props. 8554
Ear see also *Hearing*
  new types of protectors 1315
  human mastoid, impedance 2865
  instrumental ear, early work 2866
  cochlear dynamics theories, review 6342
   adaptation patterns, 3 freq. regions 6344
  acoustic attenuation between ears 6343
  organ of Corti mechanical props. 6345
  shearing microphonics by vibrations near hair c
   6346
Earth see also *Geodesy; Geophysics*
  inner core, *S*-waves detection 556
  light reflected from surface, polarization 1352
  2-layer crust isostatic model 2089
  fluid motions, rel. to rotational fluct. 2919
  hydrostatic theory of equilib. configurations 2921
  convection in mantle, topography interpret. 40
   8356
  origin, thermonuclear considerations 4577
  planetary convection theory appl. 5223
  pressure effects in interior 8720
 age see also *Radioactivity, dating*
  from Pb isotopes rel. abund. var. 2093, 5798
  Sr^{87}/Sr^{88} variation in Rb minerals, age det. ap
   2630
  crust, and max. age of elements 3765
 composition
  certain elements conc. at surface 8121
  of central core 8805, 8807
 heat
  thermal state of interior 557
  temp., core and mantle boundary 1271
  temp.-press. hypothesis 3757
  convection due to thermal instability 4053, 8356
 rotation
  air-masses, redistrib. effect 1285
   seasonal movts., effect 2918
  and magnetic field, Schuster–Wilson hypothesis
   2531
  rel. to geomag. field var., and fluid motions 2919
  free mutation period lengthening 3841
  effect of short-period oceanic tides 3842
  long-period fluct., rel. to pole Chandlerian m
   4578
  fluct., effect on seismic activity 5225

rth—*contd.*
rotation—*contd.*
- "polar tides" in sea and atmosphere 5286
- synchronism with atmos. vibration 7409
- effects of winds, displacement of axis 7410

rthquakes see *Seismology*
ho see also *Architectural acoustics; Reverberation; Sound ranging*
- obstacle perception, sound sources 2282
- echo ranging with audiofrequencies 3076
- porpoise sounds as sonar signals 4675

lipses
- solar, ionizing radn. distrib. invest. 584
  - no effect on atm. elec. field 1292
  - effect on $F2$ region 2844
  - influence on E region 5235
  - partial, effect on ionosphere 7349
  - asymmetry of r.f. observations 8188–9

astic constants see also *Compressibility; Stress/strain relations*
- metals, interpretation and importance 488
- BaF_2, CaF_2, compared 489
- modulus, steels, influence of fatigue phenomena 1188
- $ND_4D_2PO_4$ (deuterated ADP) 1236
- alloys, 65-Permalloy and Perminvar 1765
  - Cu-4 atom % Si crystal 2764
  - Ni–Mn, heat-treatment effect 4399
  - binary solid solns. 4418
  - polycrystall. MgCd 7210
- Cu, anomalous rigidity modulus 7986
- moduli, vibr. crystals, amplitude dependence 1979
- single crystal and polycrystall. state compared 2063
- Si, temp. dependence 2765
  - single crystal and fused, low temp. 7989
- glass, temp. dependence 2765
- Poisson's coeff. in elasto-plastic phenomena 2766, 6264
- Ge, — 195° to 275°c 3235
  - single crystal, low temp. 7989
- high polymers, temp. dependence 3646
  - polyisobutylene, dynamic compliance and modulus 7206
  - from torsional vibrations 7209
  - Polythene, effect of cross-linking 7211
- rel. to internal press. 3898
- KH_2PO_4, props. below Curie point 4073
- Ni, crystals 4416
  - ΔE effect, h.f. relaxation region 8601
- Cu, cold work rel. to Young's modulus 7216, 7987
- preferred orientation effect in metals 7985
- crystall. Al, var. between 63°K and 773°K 7988
- "3rd-order" coeffs. 7990
- $NH_4H_2PO_4$ by optical meth. 7991
- anisotropic material, calc. 8058

measurement
- metals, conference report 488
- ultrasonic method, electro-mech. Q-meter for 1187
  - polycrystall. MgCd, pulse method 7210
  - low temp. 7989
- electronic vibrometer appl. 1189
- rubber-like matls., at acoust. freq. 1980
- X-ray spectrometer method 1981
- improvement of Cornu's method 4417
- elastomers, shear moduli and losses, wide freq. range 6263
- polymethyl methacrylate secondary anomalous absorpt. region study 6265
- high polymers, l.f. coupled oscillator appl. 6266
- polyisobutylene dynamic mech. props. 7207–8
- ferrites, magnetostrictively excited 7811
- crystall. Al, piezoelec. method, low temp. 7988
- Young's modulus in CoO near antiferro. transition temp. 8569
- rutile, calc. from spectroscopic data 8721

lastic deformation see also *Bending; Stress/strain relations; Torsion*
- rubber, theory 6261
- in earth's interior 8720

lastic fatigue
- influence on modulus, steels 1188
- in rock salt single crystals, optical invest. 1993
- exudation at slip bands 3668
- effect of surface conditions 4400
- crack, growth 8001

Elastic losses see also *Damping*
- internal friction, rel. to magnetization in ferromag. subst. 1755
  - Ni_3Fe, rel. to magnetization 1756
  - field-cooled 65-Permalloy and Perminvar 1765
  - Si and glass, temp. rel. 2765
  - meas., vibr. metal reeds 2775
  - metals, gases effect on 3636
  - quartz 3673
  - metals, review 3674
  - rock salt, F-centres effect 3725
  - Cu, rel. to strain in cold working 7216
  - in metals, theory 7227
  - in glass, theory 8003
  - in CoO near antiferromag. transition temp. 8569
- in rolling friction 1996
- damping meas. in vibrating rods 1997
- in steel, on sound transmission 3044
- solids, liquids, gases, det. by vibration meas. 3672
- torsional vibrations of high polymers 7209
- in magnetostrictively excited ferrites 7811

Elastic relaxation see also *Creep*
- anelastic, rate of, atomic mobility in solid solns. 1160
- relax. times from rebound elasticity 2763
- spectra, higher approximations 3644
- in metals, review 3674
  - strain-hardening influence 493
- stress relaxation in elastomers 4454
- solids, internal damping, shear- and pressure-viscosity 5146
- polyisobutylene, rubberlike to glasslike transition, distrib. function 7208
- periods eval. from free torsional vibr. 7209

Elastic waves see also *Acoustic waves; Seismic waves*
- thermal wave propag. rel. to fusion 180
- critical reflections at free surfaces 685–6
- propagation in solid media 687
- stable vibrations of an elastic semispace 1440
- Love waves in homog. crust on heterog. medium 2090
- disturbance due to line source, single surface layer media 2261
- dispersion and absorpt., fluids, rel. to molec. motion 3001
- oblique, surface motion assoc. with 3030
- transient, optical lever meas. tech. 3035
- longitudinal elastic-plastic waves 3037
- from simple source in isotropic solid 3052
- in non-Newtonian liquids 3899
- in steel bars, wire strain gauge study 3933
- absorpt., relaxation mechanism 3947
- critical reflections at free surfaces 3954
- stress waves in solids (book) 4421
- in piezoelec. crystals, theory 4792
- propag. in $NH_4H_2PO_4$ 7991
- longitudinal, in cylindrical rods 8278
- vel. in metals rel. to temp. 8285

Elasticity see also *Mechanical strength; Stresses, internal*
- of metals, conference 488
- clay bed settlement under conc. load 1175
- blown bitumen, Weissenberg effect assoc. 1197
- thermal stresses det. in partially damped half-plane 1400
- stability and the intrinsic curve 1978
- metal crystals vibr. strain pattern 1979
- Pb, Cu, Al, u.s. invest. at liq. N temp. 2272
- rubber, rigid rods model 3645
  - heat produced by strain 5139
  - statist. thermodynamics 6262
- viscoelasticity, props. rel. to activation energies distrib. 3655
  - metals, review 3674
  - polyisobutylene, models 7206–8
- elastic freq. distrib. singularities, crystals 4473
- anelastic effects in Fe containing V and N 5123
- thermal damping of vibrations 5928–9
- dislocations, interactions with sound waves 6268
- boundary problems, field vector integral repres. 6456
- linear elastic stability, critical analysis 6496
- circular plates theory, Bessel functions 6497
- elasto-plastic stress-optical effect AgCl 6678
- matter tensors in symmetrical systems 7965
- Laval's theory, exptl. support 7991
- solids, elastic spectra from sp. ht. data 8772

Elasticity—*contd.*
- **liquids** see also *Compressibility, liquids*
  - rheometer theory, Bessel function appl. 495
  - viscoelasticity, non-Newtonian liquids 3899
      - rigidity 5145
    - in conference report 5315
    - secondary stress theory test 5871
    - dil. polymer solns. 5872
    - non-Newtonian viscosity, fixed shear temp. coeffs. 5873
    - polystyrene fraction viscosities shear rate effects 5874
    - short-range order rel. to temp. 5875
    - polystyrene–decalin, dynamic mech. props. 5876
    - coiling polymer, dil. solns., props. 6510
    - emulsions and suspensions 7255
    - dynamic viscosity rel. to rigidity 7482
  - conference report 5315
  - of emulsions and suspensions 7255
  - N, tensile strength 7479

Elastodynamics
- dynam. modulus and viscosity expressions, visco-elastic subst. 3655, 7482
- dislocation, eq. of motion 4479
- polystyrene–decalin, dynamic mech. props. 5876
- elastomers, mech. invest., wide freq. range 6263
- polyisobutylene, dynamic compliance and modulus 7206–8

Electric breakdown see *Breakdown, electric*

Electric charge see also *Space charge*
- macroscopic charges within solutions, formation 2431–2
  - visible demonstration 3007*, 8012
  - importance in electrolysis 7245
- liquid spray and dust electrification statistics 2433
- aerosols, distribution, instrument 2792
  - changes, effect on ageing 4451
- surface density calc. 3281
- on water drops, meas. 4516
- phenomena during crystallization and solution 5895
- influence on heat transfer, liquids 5998
- of fast electrons, meas. 6742–3
- surfaces not electrified by metal contact 6748
- Tl^{204} use in radioactive static eliminators 7649
- growth by ice accretion in thunder clouds 8134

Electric fields see also *Field theory, electromagnetic*
- flux and potl. due to disk, calc. 1603
- discontinuous, formation of macroscopic charges in solns. 2431–2, 3007, 7245, 8012
- in cyclotron dees 2496
- conformal maps 2891
- magnetic dipole source in dissipative medium 3446
- electrostatic ion beam analyser, calc. 5525
- action on spreading of liquids 6520
- 2-dimensional, above and below infinite corrugated sheet 6745
- alternating, luminescence in phosphors 7602
- effect on phosphor 8330

Electric strength see also *Breakdown, electric*
- KCl crystals, factors affecting 1620, 6759
- KCl and NaCl crystals, elec. strength temp. rel. 3342
- crystals with high, calc. 5493
- rock salt, dependence on cryst. direction 5494

Electrical measurements
- varying frequency instantaneous meas. 91
- recording a.c. Hall effect apparatus 340
- contact potl., Kelvin and electron beam methods compared 826
  - in high vacuum 7650
- in dielectrics, survey 828
- sensitive current integration and microammeter 906
- d.c. microampere integrator 1628
- power, servomechanism for time lag elimination 1686
- potential of current-carrying electrode 2015
- microwave vibration wattmeter 2560
- voltmeter, electrometer valve 3282
  - non-linearity error 3283
- galvanometer, extreme sensitivity 3295
  - coupled system, fluctuations 3296
- constant battery Wheatstone bridge 4111
- an isolating potl. comparator 4783
- electrometers, Brownian movements 6441–2
  - influence of microseisms 6443

Electrical measurements—*contd.*
- ohm, absolute determ. 6765
- conductivity in geophys. prospecting, bridge 7663
- d.c. conductivity meas. of glass 7664

Electrical units see *Units, electrical*

Electricity
- high voltage generation by radioactive matl. 428
- student computations, demonstration circuit par 2558
- a.c. circuit demonstrations 3444

Electrobiology see also *Biological technique*
- potential distrib. in electrocardiography 4782
- electroretinogram of stray light 5815
- elect. responses of light-adapted eye 5816
- respirator for electrically shielded rooms 8136
- instr. for producing microelectrodes 8140

Electrochemistry see also *Chemical analysis; Electroly*
- corrosion, influence by ultrasonic waves 87
  - fundamental energy principles 2016
- electrical phenomena at interfaces 866
- Mn O compds., depolarizing props. 1218
  - cell with MnO_2 depolarizer 1219
- irreversible processes, thermodynamics 2012, 838
- electrochem. potential of different cryst. faces 27
- activity coeffs., Gronwall's method for Bagchi c 2786
  - rel. to conc., strong electrolytes 6286
- electrolytic Al_2O_3 rectifier 3305
- Mn ion incorporation in NaCl and KCl 3720
- double layer, charging process for colloidal parti 5161–2
  - single-plane Poisson–Boltzmann eq. 5163
  - diffuse, theory, unsymm. valence types 6291
- min. entropy prod. stationary states 5164
- Weston standard cell, local action currents 5165
- ultrasonics, applications 5747
  - influence on corrosion 87
  - colloidal and ionic vibration potentials 5748
- ion distrib. in solutions 6290
- semiconductor impurity ionization, chem. effects 67
- history of theory 7238
- in biology (1902–52) 7239
- Faradaic admittance, theory 7243
- Fe, anodic behaviour in H_2SO_4 7251
  - passivity and Flade potential 8738
- non-aqueous solutions 8011
- gases, review 8021
- ionic crystals, review 8063
- strong electrolytes theory 8737
- Ca, indirect polarographic det. 8756
- **electrodes** see also *Electrolysis*
  - acridyl radicals formation 512
  - electrical phenomena at interfaces (book) 866
  - d.c. field influence on adhesion tension 1414
  - charge-free electrodes, interpretation 2014
  - current-carrying, method of potl. meas. 2015
  - pH response of non-hygroscopic glasses 2787
  - calomel, struct. and orient. 3713
  - prod. of alt. potential by acoustic waves 5750
  - gallium/gallic ion couple, standard potl. 5755
  - H electrode kinetics, summary 7247
  - stress effect on metal electrode potls. 7249
  - pulverizability and surface struct. 7250
  - potential of uncharged metal in soln. 8016

Electrodes see *Cathodes; Electrochemistry; Electrolys*

Electrodynamics see also *Field theory*
- e.m. momentum and Newton's 3rd law 975
- unified field theory, modification of Einstein's 13
  - 5-dimensional theory 6446
  - 6-dimensional generalization 6447–8
  - 5-dimensional theory, quantum theory rel. 742
  - non-Riemannian 8209
- text book 2553
- relativistic, of magnets 2554
- magneto-hydrodynamics, wave propag. in differ fluids 2561
  - isotropic turbulence eq. 2232
  - in compressible medium turbulence 2992
  - shock waves 3799
  - oscillations of a star 3829
  - generalized formulae 4919
  - longitudinal waves, properties 5339
  - shock waves in plasma 8583

A complete list of the Subject Headings will be found at the end of the Index.

Electrodynamics—*contd.*
electrodynamic potl., Onsager relationships 4083
ideal plasma, eq. of motion 4222
Dirac's new formulation 5450, 7647
  angular momentum 1767
  energy momentum tensor 1768
  gauge invariance 2190
  conservation laws 4594
  electromagnetic vacuum theory 4595–6
  gauge transformations 6461*
  and quantum, correspondence 7432
  field eq., multi-stream 7436
electromag. pump for liquid metal 5580
Planck's energy inertia law formulation 6149
motion of conducting sphere, uniform mag. field 7787
Electrokinetic effects see also *Electrophoresis; Zeta potential*
electrical phenomena at interfaces (book) 866
streaming potential, and electro-osmosis, mech. 1652
  across capillaries, sinusoidal press. 2470
charge formed during diffusion, made visible 3007*
electromagnetokinetic, neutral particles migration 3321
charged dielec., flow in tube 4114
dynamic potls. of fresh liq. surfaces 4115
thermomechanics of transport phenomena 4642–3
colloidal and ionic ultrasonic vibration potentials 5748
porous-coated wire in soln., acoustic effect 5749
potential generated on H electrode by sound 5750
Electrolysis see also *Conductivity, electrolytic; Dissociation, electrolytic; Electrochemistry; Ion velocity*
alumina in fused cryolite, electrolytes charac. 509
electrolytic tank, electron trajectory tracing appl. 895
Zn ion migration in ZnBr, isotopic effect 1216
colour centre generation, NaCl 2061
radio-iron, electrolytic dosage 5751
membrane accumulator 6292
aq. solns. CdS, by a.c. 6289
current distrib., effect of a.c. component 6294
diffusion and convection in, theoretical review 7242
molten aluminates of Na, Ca, Ba, Mg 7244
macroscopic charges in solutions, effects 7245
  rel. to spark electrolysis 8012
Hittorf phenomenon, inversion 8018
  modification 8019
electrodes
atomic H, conc. at cathode 510, 4446
  and H overvoltage 511
Pt cathodic polarization, discontinuity 2013
  capac. in HCl 5756
Pd, H transmission study 2752
tensile specimen prod. by electro-turning 3667
ionic current and oxide film growth, Al 5125
polyvinyl alcohol influence on Cu overvoltage in $CuSO_4$ 5757
a.c. polarization with potl.-defined step 6293
H electrode kinetics, summary 7247
H overvoltage on bright Pt 7248
friable cathode deposits, metals, X-ray study 7980
electropolishing, mechanism 8017
  steel, roughness meas. 1162
  cleaning by cathode spraying 1217
Debye–Huckel eq. for polarized electrode 8020
Electromagnetic oscillations
varying frequency instantaneous meas. 91
microwave phenomena in gases 124
plasma, hot-cathode discharge generation 246
  origin of solar "enhanced radiation" 583
  effect in transit time tubes 1667
  interactions with particles 3329
  in crossed elec. and mag. fields 6151
  magneto-hydrodynamic shock waves 8583
r.f., in a.c. silent discharges 254
  effect of light 4822
plasma-like, frequencies 255
frequencies resulting from distortion 692
resonance effect in h.f. discharge, mag. field 872
automodulation at ferro-resonance 977
losses in conductors, rel. to mag. reson. absorpt. 984
arc in hot cathode disch. tube 1658–9
non-linear oscillator disturbed by noise 1769
beat oscillator, wide-range, high-stability 1770
  switching from sweeping to fixed freq. 8453
Electromagnetic oscillations—*contd.*
cavity resonators, impulse analysis appl. 1771
  filled by monocrystall. biaxial dielectric 2559, 5582
  high-ε cavities, quasi-degenerated modes 3448
  field expansions in loss-free cavities 3449
  dielec. const. spectrum det. appl. 5581
  ferroelec. permittivity meas. appl. 8390
  spherical cavity degenerate modes, utilization 8587
isotropic turbulence eq., magnetohydrodynam. 2232
subharmonic, in nonlinear systems, extinction 2557
microwave vibration wattmeter 2560
forced, with nonlinear restoring force 3447
nonlinear system coupling, electromech. analogue 3450
Hertzian source for mm waves 4017
spontaneous, gas discharges 4223–4
asymmetric metal resonators, "microwave Cotton effect" 5583
semicond. dielec. props. meas., resonant circuit 6032
an ultra-high-frequency discriminator 6152
surface wave resonator velocity det., short waves 6581
space-charge waves 6965
in homogeneous flow of electrons 6966
microwave freq. standard 8584
circuit for r.f. spectrometer 8585
Electromagnetic wave propagation see also *Absorption, Diffraction, etc.*
microwave phenomena in gases 124
  in discharge plasma, interaction 4929
mean vel. in heterog. absorbing ionized medium 337
impulse electromagnetic fields 978
Sommerfeld's surface wave 979
  non-existence 330, 6967
book notice 980
longitudinal and transverse waves, in plasmas 1668
in electron-ion streams 1772
Hg vapour discharge admittance 1775
magneto-hydrodynamic 2561
  isotropic turbulence eq. 2232
  generalized formulae 4919
  shock waves in plasma 8583
wavefront propagation in dispersive media 2569
  heterog. dispersive media 2570
pulse, in seawater 3446
white light in vacuum 3451
in ionized medium, varying parameters, differential eq. 3456
through inhomogeneous medium, approximation error 3457
geophysical exploration interpretations 3761
  metallic model experiments 3762
through earth, attenuation 3763
radiation fields (book) 4225
ray theory applicability in stratified media 5375
microwave, astigmatic diffract. effects 5587
through crystal plate 6576
U.R.S.I. discussions 6968
2-dim. lattice medium, gen. theory 6972
surface wave, over curved coated conductor 7800
artificial dielectrics, mag. loss tangent, particle size effect 7803
interference of pulse trains 8586
atmosphere
radiowave velocity, new det. 336
atmospherics, mean level rel. to intelligibility 982
  joint commission report 1278
  sources 1298
  location, meteorol. situation rel. 1299, 7366
  tornado identification 1303
  propagation 1788
  whistling, invest. 7366, 8135
  with very low freq. components 7806
  simultaneously received, location 8594
  magnitude and waveform 8819
radio-meteorology, joint commission report 1278
  in Japan 1300
  microwave attenuation by atm. gases and rain 1301
  tropospheric refract. index fluct. records 2856, 5257
  tropospheric field strength, seasonal trends 2857
  in New Zealand 5592
  tropospheric v.h.f. propag., meteorol. factors affecting 6973
  signal strength rel. to "weather perception" by individual 8809

A complete list of the Subject Headings will be found at the end of the Index.

Electromagnetic wave propagation—*contd.*
- **atmosphere**—*contd.*
  - from lightning, radiation of elec. field variations 1294
    - v. long waves, wave spectrum 1787
    - signal bursts 5589
    - v. long, along earth's surface 6155
  - waveguide effects, non-uniform height duct 2572
    - 16 kc/s wave propag. to great distances 7804
    - microwaves, oceanic duct 8592
  - ionospheric radio reflection in atm. research 2842
  - tropospheric refractive index, fluctuation records 2856, 5257
    - calc., nomograms 4520
    - gradient, geog. and height distrib. 5256
    - gradients, effect on reflection 5593
  - random fading charac. studies 3460
  - radiation fields (book) 4225
  - ground-wave, effect of large dielec. const. 4232
  - well beyond horizon 4930
  - over land-sea surface 4933
  - over flat earth, across 2-media boundary 4934
  - analogy with wave-mechanics 5590
  - in troposphere, conference on all aspects 6973
- **ionosphere**
  - oblique incidence, measurements 562
    - over equatorial region, mag. field effect 4233
    - penetration frequency 5596
  - interaction theory, radiowaves 983
    - gyrointeraction, resonance curves 1789, 2573, 8596
    - magnetic-ionic waves, limiting polarization 3462
    - effect of crossed mag. and oscill. electric field, theory 5594
    - motions of slow electrons in air, appl. 6901
    - alternative theory 6975
    - interaction, conf. rep. 6976
  - long distance radiowave, ionospheric gradients effect 1297
  - wave eqn. soln. for rapidly varying index 1786
  - radio atmospheric 1788
  - sky-wave field strength calc. 1790
  - reflected radiowaves, limiting polarization 1791
  - ionospheric winds study, by radio echoes 2097
    - and turbulence, with long radiowaves 4499
    - conference report 6976
  - reflection and absorption of radiowaves 2574
  - v.l.f., l.f. and m.f. waves 2575
  - short wave absorpt., geomag. field influence 3461
  - magneto-ionic waves, limiting polarization 3462
    - ionospheric anisotropy calc. 5595
  - Maxwell's eq. appl. 3463
  - polarization ellipse 3464
  - effect of irreg. on phase-path and ampl. 3465
  - decametre waves in arctic regions 3466
  - radio echoes from meteor trails, decay 4560
  - radiowave reflection from vertical and horizontal gradients 4935
  - v.h.f., review 6156
  - conductivity and dielec. tensors, expressions 6974
  - radio propagation by scattering and l.f. 6976
  - absorpt. calc., short waves 7807
  - plane wave, attenuation, group velocity, calc. 7808
  - earth's mag. field effect on short waves 8595
- **waveguides**
  - pyramidal horn theory 332
  - periodically loaded, impedance 333
  - magnetic double refract. microwave frequencies, demonstration 339
  - radiant energy particle props. 1782
  - inhomog.-filled, const. calc. 1783
    - survey 3453
  - slotted arrays, 2nd-order beams 1784
  - discharge, electron density and collision freq. det. 2473
  - cylindrical surface waves, charac. 2566
  - microwave meas. in artificial dielectrics 3291
  - radiation fields (book) 4225
  - circular, circular obstacle susceptance 4228
    - Faraday rotation 4229
  - diffract. by thick semi-infinite plate 4924
  - semicircular, with semicircular load 4925
  - arrays with symmetrical conductance functions 4926
  - conical helix, variable pitch 4927
  - microwave calorimeters, theory 4936
  - complex dielec. const. and permeability meas. 5460

Electromagnetic wave propagation—*contd.*
- **waveguides**—*contd.*
  - microwave Cotton effect, asymmetric metal re nators 5583
  - along infinite spiral crack 5584
  - with spiral conductor, partial dielectric filling 558
  - cylindrical, metallic, 2 different dielectrics 5586
  - modes in waveguides containing ferrites 6970
  - ferroelec. permittivity meas. appl. 8390

Electromagnetic waves see also *Diffraction, Reflect etc.; Field theory, electromagnetic; Light*
- lightning discharge, wave spectrum 1787
- spherical, addition theorems 2562
- wire-netting screening, large sources 4227
- microwaves, physiol. and patholog. effects 5814
- mm and light, generation by undulator 6852
- **radiators**
  - electrically short aerials theory 334
  - horizontal dipole in semi-infinite dissipative medi 1785
  - lightning discharge, wave spectrum 1787
  - classroom aerial expt. 2567
  - longitudinal radn. from dielec. aerials 2568
  - transient dipole source, dissipative medium 3446
  - dielec. spiral round magnetic rod 3448
  - near resonance, Hallén's integral eq. soln. appl. 3
  - e.m. radiation fields (book) 4225
  - Schmidt camera for radio waves 4928
  - microwave lenses, astigmatic diffract. effects 5587
  - spherically symmetric lenses 5588
  - dipole in dissipative medium, calc. including placement currents 6971
  - high-resolution aerial for radio-astronomy 7382

Electromagnetism see also *Field theory, electromagne Geophysical prospecting, electromagnetic*
- field equations, simplified form of relativistic 22
  - for low-speed systems 976
  - in Einstein's theory 1356
  - deduced from least action principle 2175
  - relativistic, in material medium 2929
  - general solutions 6962
- new vector identity appl. 206
- automodulation at ferro-resonance 977
- unified field theory, modification of Einstein's 13
  - 5-dimensional theory 6446
  - 6-dimensional generalization 6447–8
  - 5-dimensional theory, quantum theory rel. 7424
  - non-Riemannian 8209
- current flow in cylinders 2441
- magnetic flux density and field intensity definiti 2555
- single-wire transmission line theory 2556
- nonlinear systems, subharmonic oscillations exti tion 2557
- an extended e.m. field 2966–7
- inductively heated cylinders, temp. gradients 3441
- solenoids, stresses and stability 3442
- synthesis of unbalanced RLC networks 3443
- e.m. properties of isotropic bodies, "admittivity" 34
- current induction, disk, by mag. pole creation 422
- a criticism of the law of induction 4920
- vector potential deriv. from scalar potls. 4921
- current-carrying coil near conducting sphere 4922
- earth's elec. props. rel. to depth, induction meth 5228
- geometrical viewpoint 5578
- some vector formulae and their appl. 5579
- induction in polarized matter 6150
- mag. dispersion of sound in conducting plate 657
- induction phenomena, appl. 6963
- current element near conducting half-plane edge 69
- transient coupling of grounded circuits 7343
- vertical wire in horizontal slab, field calc. 7344
- external field of polepiece 7789

Electron annihilation
- cross-polarization effect, use in Cs^{134} γ-rays polari tion correl. 1087
- quenching of positronium decay by mag. field 109
- electron-positron annihilation in flight 2681
- positron, in liq. and solids, time distrib. 5049
- 3-photon, allowed final states 5698
  - polarization of radn. 7115
- positron annihilation spectrum in freon and O 7

- **Electron beams** see also *Electron optics; Particle accelerators*
  - optimum space-charge controlled focus 261
  - focused, shadow in "flood" beam 266
    - self-charge broadening 2481
  - in diode, conductance rel. to noise power spectrum 288
  - contact potl. meas., comp. with Kelvin method 826
  - trajectories in mag. field 890
  - e.m. wave propag. in electron-ion streams 1772
  - electron optical image 2484
  - from l.p., high voltage discharges, energy spectrum 3337
  - convergent, interference, extinction lines crossing 3354
  - interference fringes production 3355
  - velocity distrib., effect of electron encounters 3386
  - synchrotron, characteristics 4134
  - interference double refraction by crystals 4825
  - projection into atm., dynamic press. stage elements 4830
  - mono-energetic, obtained by mag. field 4843
  - behaviour at entry to coaxial mag. field 4845
  - reflected, space-charge spreading photographed 5512
  - electron beam interferometer 5515
  - interaction with slow e.m. waves, crossed fields 6151
  - fast, radiation by 6852
  - space-charge waves 6965
    - Lorentz force influence 4834
    - interactions in crossed elec. and mag. fields 4836
  - oscillations in a homogeneous flow, eq. 6966
  - thermal, energy distribution 7710
  - double focusing, 2 magnets, nonuniform fields 8443
  - **absorption** see *Electrons, absorption*
  - **effects** see also *Beta rays, effects*
    - changes produced in Sb, As, Bi films 1974
    - high-energy, butter-fat irrad., after-effect 2023
    - irradiation of org. matls., effect on fluorescence 4035
    - specimen contamination in e. microscope 5129
    - changes produced in metal-shadowed cellulose specimen 5130
    - $KMnO_4$ decomp., rel. to thermal decomp. 5137
    - $BaTiO_3$ darkening 5454*
    - effect at 800 kV on polymers 7254
    - bombardment effect on ordered Cu_3Au elec. resist. 8452
  - **ionization** see *Electrons, ionization*
- **Electron capture** see *Ions, recombination; Radioactivity, electron capture*
- **Electron diffraction**
  - image formation in Gabor diffraction microscope 262
  - new determination of $h/\sqrt{(em_0)}$ 2485
  - retarding field filter 6081
  - calibration of photographic plates 6360
  - Dirac theory, Huyghens' principle appl. 6467
  - industrial EM-4 electronograph 8444
  - "universal" electron diffraction microscope 8445
  - nuclear motion, effect 8449
  - by crystal, corpuscular theory 8779
- **Electron diffraction crystallography** see also *Crystal structure, molecular*
  - electron fringes with centre of symmetry 898
  - infl. of absorption on Kikuchi bands, PbI_2 899
  - small crystals, lattice contraction 1267
  - struct. det. from electron diffraction maxima 1268
  - instr. for production of patterns 1679
  - camera, with rotating sector 2088
    - high-resolution, design 3753
  - domain struct. information from image struct. 2486
  - interatomic distances det., review 2813
  - theory, Born approximation rel. 2837
  - polarization factor for inclined-beam photographs 3733
  - density of particle flow 3754
  - CF_4 molec. dimens. 4268
  - sericite striae. double diffract. hypothesis 4489
  - is interference double refraction possible? 4825
  - PbI_2, with convergent beam 4856
  - intensity relationships in Kikuchi bands 4856
  - origin of streaks in elec. micrographs, MoO_3, PbI_2 5132
  - single crystal lamellae shape det. 5222
  - solid state chemistry, review 5786
- **Electron diffraction crystallography**—*contd.*
  - for finite polyhedral crystal, Fresnel formula 6326
  - lattice constants determ., cubic crystals 8804
  - single crystals, techniques 8118
  - disordered boric acid, single crystal 8119
- **Electron diffraction examination of materials** see also *Crystal structure, molecular*
  - cyclobutane molec. structure 1017
  - cyclopropene molec. struct. 1018
  - $CoCl_2.6H_2O$, control of action of beam 1232
  - substances with spinel-type struct. 1264
  - instr. for production of patterns 1679
  - nonrigid molecules struct. det., Eller's optical machine appl. 1825
  - Sb, As, Bi films, changes due to electron beam 1974
  - polished surfaces 1976
  - oxide films, alloys, selective oxidation 1977
  - Sn thermal oxidation layer 2756
  - tertiary butyl fluoride 3137
  - CuAl alloys evap. *in vacuo* 3642
  - AgBr behaviour under fast electrons 3643
  - gutta percha examination 3746
  - Ag nitrate and sulphate action on sphalerite 4470
  - H bonds in boric acid 4488
  - reorientation of alk. halides on mica 5200
  - chem. and phys. transformations 5733
  - electron distrib. in atoms 6184
  - hydroxide films on Mg, Al, Fe, Cu 6255
  - ZnO films on Zn crystal 6307
  - heated galena, surface roughening of oxidation 7193
  - growth and orientation of vapour deposits 7198
  - thin film grain size Au, Pd, Au–Pd 7971
  - stacking faults in γ–Al_2O_3 8117
  - Mishima alloys (Alnico 5) 8556
  - action of mercuric sulphate on galena cleavage face 8719
- **Electron emission** see also *Fluctuations, electrical Photoelectricity; Thermionic emission*
  - cold, from oxide and tarnish film electrodes 246
    - in discharges, review 8427
  - Cu electrodes surface treatment, effect on breakdown 883
  - at some W monocrystal faces, work function 885
  - field emission; from photoconductors 887
    - from Ta in normal and superconducting state 236
    - from Ni surfaces 2477
    - internal, from insulating crystal defects 2478
    - in discharges 3345
    - velocity distribution 4831
    - Fowler–Nordheim functions, corrections 4832
    - ditto, slope of logarithmic plots 884
    - of individual crystal surfaces 6078
    - and surface films 6079
    - current density tables 7711
    - of crystal phosphors 8334
    - in alkali halide crystals 8397
  - from freshly cut metal surfaces, H_2O_2 formation 3690
  - spontaneous, metals and non-metals, temp. studies 4833
  - from atom outer ring, simultaneously with β-emission 5020
  - space-charge limited, in semiconductors 6046
  - from monocrystall. point, investigation by spherical projector 6077
  - from metal in cold to thermionic transition range 6080
  - field emitter, fabrication, examination and field calc. 6834
  - field emission microscope study of O and C surface react. on W 7256
  - on stripping high polymer films from glass 7709
  - Zn single crystals, Kramer and Russell effects 8442
  - secondary
    - rate of production, theory 267
    - spurious pulses in photomultiplier 287
    - field-dependent, mechanism 904
    - from BaO 905
      - films, changes during bombard. 3401
    - by Li-ion bombardment, metals 914
      - W, Ta 6101
      - ditto, oxidized 6102
      - Ni, duralumin 6870

- **Electron emission**—*contd.*
  - secondary—*contd.*
    - by He-ion bombardment, Mo 1693
      - Ta 7731
    - mesonic Auger effect 1945
    - from Cu and Ag films, primary energies below 10 eV 2494
    - in gases, correction for back-diffusion of photoelectrons 3398
    - origin of electrons 4859
    - sec. emission multipliers development 4860
    - Ag film, output rel. to thickness 5520
    - Cu–Be alloy 6090
      - activation for multipliers 6849
    - by K-ion bombardment, W, Ta 6100
      - ditto, oxidized 6102
      - liquid Sn 6103
    - for surface examination 6841
    - MgO, crystalline 7724
      - self-sustained, mechanism 7725
    - measurement, method 7726
    - by ion neutralization near metal surface 7732
    - insulators under electron bombard., meas. 8450
- **Electron lenses** see also *Electron microscopes; Electron optics*
  - paraxial constants, deriv. from integral eq. 4136
  - trajectory det. by successive integration 4837
  - axial astigmatism test 4846
  - spherically symmetric, var. refract. index 5588
  - types of e.s. and mag. (book) 6836
  - magnetic and e.s., aberrations rel. to lens power 7716
  - **electrostatic**
    - gridded, spherical aberration 1676
    - immersion objective, potential distribution 1677
      - with plane electrodes 3349
      - ditto, focusing 3348
      - low voltage 4849
    - characteristics of "eigenlinse" 1678
    - spherical aberration meas. 1680
    - spherical aberration calc. 2483
    - for v. high-energy particle focusing 3350
      - trajectories calc. 5514
    - a lens permitting rigorous calc. 4137
    - cylindrical, 3 aperture, potl. and field 5513*
    - repres. by pure resistance quadripoles 7714
    - potential, calc. and meas. 7715
  - **magnetic**
    - axial induction, 1st and 2nd derivs. 260
    - WKB approx. solution 2482
    - long, theory 3352
    - annular correction 4839
    - unsat. pole-pieces, field distrib. formula 4840
    - as velocity analysers 4841
    - mag. pole-piece lenses, asymmetry invest. 4842
    - remanence in soft Fe circuits 4847
    - meas. of field along axis 5562
    - sector-shaped, angular aberrations 6837
    - pole-piece saturation, effect 7717
    - circuit design, for microsope 7720
    - double-focusing, 2 magnets, nonuniform fields 8443
- **Electron microscope examination of materials** see also *Crystal structure, molecular*
  - Fe points, unexplained results 1182
  - solids, surface replica methods 1183
  - electrically precipitated deposits 1973
  - text-book 2489
  - Fe, graphitic surface formations 2760
  - conference report 3351
  - of solids, by reflection 3638
  - precipitated radioactive particles 3640
  - AgBr, effect of irradiation 3643, 8716
  - Li soap-oil dispersions 3691
  - particle size det. 4413
  - beryl and CdI crystals, surface 4467
  - new type striation, sericite 4489
  - textile fibres, conf. rep. 5127
    - sections by double replica 5128
  - object changes rel. to beam intensity 5130
  - interference streaks with organic substances 5131
  - streaks origin with MoO_3 and PbI_2 5132
  - vacancies in single crystal lamellae made visible 5133
  - powdered materials, images eval. 5135
  - analysis of deposited layers 5136
- **Electron microscope examination of materials**—*contd.*
  - $KMnO_4$, changes, rel. to thermal decomp. 5137
  - surface struct., scanning microscope appl. 5138
  - single crystal lamellae shape det. 5222
  - fog nuclei 5244
  - snow crystal nuclei 5245–6
  - cellulose elementary fibrils 5728
  - membrane filter pore system data 5734
  - minerals, estimation by diffraction 5735
  - image defects 6087
  - stretched pure Al, surface 6252–4
  - method for rough surfaces 6259
  - Fe–Si ferromagnetic domains 6260
  - field emitter, geometry 6834
  - techniques for crystals 7205
  - crystal growth step heights 7282
  - sea spray, condensation nuclei data 7355
  - Zn film formation 7972
  - ferromag. powder particle size meas. 7974
  - replica tech. in chem. precipitation study 7983
  - polished mineral surfaces 7984
  - grain size in nuclr. emulsions 8159
  - macromolecules, size meas. in suspension 8629
- **Electron microscopes** see also *Ion microscopes*
  - resolution in projection microscope 886
  - e.s. immersion objective, resolving power meas. 8
    - new high-resolution type 897
  - Stigmator, astigmatism correcting device 1681
  - reflection, design and resolving power 2487
  - chem., biol. and metallurgical appl. 3351
  - e.s., 3rd-order spherical correction 4844
  - scanning, for opaque specimens 4850
    - surface structure exam. appl. 5138
  - e.s. lab. microscope construction 4851
  - image defects 6087
  - design for low price production 6840
  - image aberrations, imperfect emitting cathod 6842
  - projector pole-piece elements spacing, exter control 6843
  - electrode contamination in optical system 7204
  - emission, resol. improved by pulse operation 7718
  - adaptation for reflection, image formation 7719
  - industrial EM-4 electronograph 8444
  - "universal," construction and optical features 844
- **Electron microscopy** see also *Crystal structure, molecul*
  - diffraction image formation with electrons in Gab microscope 262
  - cantilever microtome for precision sectioning 790
  - electronic fringes with centre of symmetry 898
  - solid surface replica methods 1183
  - thin glass layers as supports 1184
  - of solid surfaces, conf. rep. 1185
  - dark-field, with defined lattice reflections 1186
  - molec. images with projection microscope 1707
  - specimen mounting grids, photographic prod. 197
  - image structure interpret. 2486
  - detail from different voltages, coloured light app 2488
  - practical (book) 2489
  - metal surfaces, new replica method 2760
  - combination with phase-contrast microscopy 2761
  - particulate matter prep., uniform dispersion 2762
  - conference report 3351
  - high resolution replica tech. 3639
  - shadow-cast, role of scattering, optimum thickness films 3641
  - direct meas. of images 4414
  - step wedge for direct sensitometry in microsco 4415
  - origin of specimen contamination 5129
  - assessment of objects by rotating 5134
  - double-replica method with C layers 5732
  - retarding field filter 6081
  - Ti replica 6256
  - shadowed silica replica prep. 6257
  - contam. of shadow-casting metal with W 6258
  - surface imaging by electron emission 6841
  - determination of specimen temp. chemically 7203
  - method of observing selected areas 7973
  - specimen damage by shadow bombardment 7981
  - contour lines on the shadowed side 7982
  - exposure meter, appl. to choice of developer 8830

A complete list of the Subject Headings will be found at the end of the Index.

lectron optics see also *Beta-ray spectrometers; Electron lenses; Ion beams, focusing*
- intensity limitations in X-ray point source 259
- optimum space-charge controlled focus 261
- periodic trajectories in elementary magnet field 890
- crooked trajectories in mag. field with symmetry plane 891
- paraxial trajectories in e.s. lenses 892
- trajectories calc., generalisation to linear homog. differential eq. 893
- double focusing with wedge-shaped, non-uniform mag. field 894
- automatic trajectory tracer 895
- e.s. velocity analyser in electron collisions study 900
- fluoroscopic images intenstification 1319
- an electron diffraction instrument 1679
- image of electron beam 2484
- image structure interpret. 2486
- textbook 3347
- interference, extinction lines crossing 3354
- interference fringes with electron beams 3355
- electronic telescope, analysis and improvement 4557
- trajectory plotting by successive differentiation 4838
- spherically corrected systems, adjustment 4844
- beam behaviour at coax. mag. field entry 4845
- magnetic, in long-beam amplifier tubes 4848
- electron beam interferometer 5515
- effective length of electrostatic analyser 5525
- e.m. field invest., appl. to internal photo-effect 6057
- props. of e.s. fields having diad symmetry 6082
- relativistic, of non-axially symmetric e.s. fields, basic relations 6083
- numerical integration of a class of eq., appl. 6084
- systems with charged surfaces, aberrations 6085
- focusing in mag. fields, "non-optical" theory 6086
- applications and theory (book) 6836
- trochoidal analyser 6838
- ideally focused systems, space-charge requirements 6839
- paths in space-charge fields, membrane model 7712
- central systems, 3rd-order aberrations calc. 7716
- image formation in "reflection" microscope 7719

ectron pairs see also *Electron annihilation*
- creation inside nucleus 420
- Mg^{24} internal conversion 424
- production by electrons 903
- an electron-electron ang. correl. 1094
- creation, in collision between spin $\hbar/2$ particles 1383
  - in homogeneous magnetic field 2679
  - intermediate coupling theory 3569
  - de-excitation of nucleus by 5697
  - in heavy particle collision, theory 8670
- lens-type pair spectrometer 1899
- produced by photons, meas. with lens spectrometer 1900
- momentum transfer and divergence angle 3570
- ortho-para-positronium conversion 4292
- stability of simple positron compounds 4293
- production cross-section, $19\cdot5$ MeV 4330
  - Z-dependence 2680, 5046
  - relative low energies 3568
- angular separation rel. to pair energy 4331
- production by μ-mesons 4388
- internal pairs in anisotropic emission 5047
- meas. for 70 MeV X-ray spectrum det. 6827
- high-energy, prod. by π^- in nuclear collisions 7909

ectron theory see also *Field theory; Fundamental particles*
- current density in quantum electrodynamics 608
- Dirac electron, zitterbewegung 614
  - pilot-wave and double solution ideas appl. 43
- electron-neutron interact., psc. meson theory 623
- polaron theory 1249, 1630
- self-energy, in modified unified field theory 1359
- nature of mass and change 1366
- g-factor according to classical field mech. 1367
- modification by ι_k and χ_k interchange 1368
- Dirac–Schrödinger, in similarity theory of relativity 2170, 7420
- a logical quantum dynamics 3862
- free, in unitary quantum electrodynam. 4593
- Dirac's new electrodynamics formulation 5450
  - interpret. and generalization 7648

Electron theory—*contd.*
- 5-dimensional quantum theory 7424
- solution of eq. of electron 7437
- wave functions as objective descriptions 7463
- Schwinger's variational principle, scattering appl. 8229
- self-stress theory, anal. 8231
- rigid electrons, quantum mech., and Lamb shift 8240

Electron tubes see also *X-ray tubes*
- spurious pulses from type 5819 photomultiplier tube 287
- transit time, plasma oscillations effect 1667
- cathode-ray oscilloscope, precision calibration 2922
- electrometer valve voltmeter 3282
- decimal counter tube 3385
- travelling wave electron encounters effect 3386
- cathode-ray tube, pos. and neg. ions 4171
- space-charge-limited currents, inclined electrodes 4172
- space charge reduction of flicker effect 4173
- l.f. noise, measurements 4174
  - in electrometer tubes 4175
- magnetron, statistical theory 5543
  - thermodynamic theory 8476
- with helical travelling wave, theory 6873
- electron path tracing, membrane model 7712
- physics in valve industry 8461
- **diodes**
  - noise power spectrum rel. to electron stream conductance 288
  - plate current, filament voltage effect 289
  - electron transit time, initial velocities influence 290
  - cathode temps., elec. meas. 940
  - limited current, potl. distrib. 1705
  - mech. meas. device 2222
  - electron encounters effect 3386

Electrons see also *Beta rays; Crystals, electron states; Cosmic rays, electrons; Fluctuations, electrical; Nuclear reactions, electrons; Photoelectricity; Space charge*
- Rydberg constant and atomic mass 205
- mean free paths in Ag film 214
- mobility, in Ge 221
  - in O 935
  - conduction, in high elec. fields 1642
  - electron and hole, rel. to field, Ge and Si 6044
  - high-field, Ge, with impurity scattering 6045
  - in polar crystals 6767
- sound wave emission in metal, rel. to superconductivity 235
- in gas discharges, d.c., distrib. 253
  - removal in Kr afterglows 871
- microwave, diffusion theory of d.c. flow 1661–2
  - density and collision freq., det. 2473
  - interaction with charged particle 3329
  - energy meas. 7693
  - energy distrib. 8435
- electron-electron impacts effect on radiowaves absorpt. 338
- inelastic collisions, with atoms, strong coupling 383
  - in He, Townsend coeff. calc. 3391
- magnetic moment, anomalous 387
  - and positrons, calc. 4781
- conduction, in metals, volume occupied 838
  - mobility in high elec. fields 1642
- velocity distribution, in field emission 886
  - positrons from μ-meson decay 472
  - of pulsed thermionic emitters 4890
- pair production by 903
- indistinguishability in theoretical chemistry 997
- motion, in field of Hg atom 1038
  - in weak periodic elec., and const. mag., field 3717
  - in Coulomb field 3886
  - in non-sinusoidal period. fields 4474
  - axial, in linear accelerator with $\beta = 1$ 6833
- low-energy delta rays, due to α-particles and protons 1064
- pos. and neg., evidence for no mass difference 1084
- photo- and Auger-, from X-rays, ang. correl. 1094
- positronium decay, quenching by mag. field 1096
- slow, motion in polar crystals 1248, 4475
  - diffusion in N and H 2508
  - self-energy in polar matls. 4476
  - in air, properties 6901

Electrons—*contd.*
- spin degeneracy in collective electron ferromagnetism 1738
- atomic, ejection in large-angle scatt. 1851
  - eigenfunctions and energies, det. 1852
  - K-electrons stopping power 1850
  - rôle in α-emission 1874–5
  - spatial relation in atoms and molecules 7842–3
  - excitation by α-disint., Po^{210}(RaF) 7859
  - excitation by emission of α- and β-rays 7860
- Auger effect (book) 1898
- in crystals, zonal theory 2058
- emulsion sensitivity, rel. to sensitivity to light 2123
- ensemble perturbed by e.m. field, thermodynamics 2185
- in spherical cavity in liq. NH_3, stability 2245
- new determination of $h/\sqrt{(em_0)}$ 2485
- capture, by protons in H 2515
  - and recapture in phosphorescence 2364
  - and loss by fission fragments 5090
- high-energy, produced in thunderstorm 2853
- drift velocity, in elec. field, argon-alcohol mixt. 3394
  - in gas mixture, ioniz. chamber meas. 6902
  - in BF_3 8479
- photoelectron back diffusion, effect on sec. emission coeff. 3398
- cylindrical system, mag. behaviour for all fields 3421
- two-dimensional system, diamagnetism 3422
- internal photo-effect, quantum-statist. treatment 3473
- in metallic lattices, entropy 3477
- Thomas–Fermi electron density, theory 3534
- Auger, produced in μ-meson capture 3567
- m/e, direct comparison with positrons 4070
- electron gas, hydrodynamic props. 4071
  - degenerate, susceptibility, electron mass role 2551
  - enclosed, diamagnetism 4199
- collision freq. in Ge, microwave det. 4077
- new multiplication process 4128
- collective electron ferromag. theory 4203
- nearly free, in metals, exchange energy 4242
- stability of simple positron compounds 4293
- external and internal, exchange interaction in ferromagnetism 4901
- existence of positronium chloride 4943
- concentrations in F layer 5237
- cosmic, as source of galactic radio noise 5273
- produced in fast meson decay 5714
- interactions, neutron, from reflection data 5724
  - with lattice vibrations 2580, 6980
  - ditto, metals 4243
- 2-electron self-consistent field 5862
- diffusion on Fermi-surface, metal conductivity interpret. 6037
- photoelectrons due to 0·5 MeV polarized photons, distrib. 6229
- charge of moving electrons, meas. 6742–3
- currents in thin oxide films on Al 6772
- in cylinder, low temp. diamagnetism 6805
- avalanche in insulator under high field 6826
- kinetic energy, influence of magnetic impulses 6835
- positron detect., scint. counter appl. (book) 6884
- Compton, initial distribution 7112
- produced in lead by mesons 7166
- plateau/min. grain density ratio, emulsions 7370
- distribution in solids from magnetic meas. 7791
- spin in semiconductors 8400–1
- rectifier barriers, diffusion theory, mobility variation effect 8418
- in metals, free energy expression 8608
- cooperative electron phenomenon in dil. alloys 8609
- free, density within atom bound orbits, incomplete Fermi–Dirac functions 8643
- **absorption** see also *Beta-rays, absorption*
  - influence on Kikuchi bands and light-dark struct. 899
  - fast electrons, straggling, Be, Al, Cu, Au, polystyrene 902
  - reson. capt. from H by slow protons 3578
  - and positrons, absorpt, in Pt, Al, Cu, Au compared 4835, 6089*
  - energy losses in uniform movement, calc. 7713
  - thin foils, straggling distrib. 7723

Electrons—*contd.*
- **ionization**
  - loss, fast electrons, in Be, Al, Cu, Au, polystyren
  - energy expenditure per ion pair 933
  - dissociation of cyclopropane 999
  - ionization loss at relativistic energies 2492
    - polarization effects 8451
  - excitation and ionization functions for fast ele collisions 4861
  - of excited H atoms, calc. 4887
  - energy losses in uniform motion, calc. 7713
  - specific probable ionization, cloud chamber s 7727
- **radiation** see also *Bremsstrahlung; Cherenkov r tion; Electrodynamics*
  - radiative transfer source function, variat method 477
  - accelerated relativistic electrons, quantum effect
  - electron-induced showers in Cu 2495
  - high-energy electron in const. mag. field 4862
  - eigen-energy and radiation corrections 5294
  - quantum theory 5521
  - in large orbits 6091
  - losses, in uniform motion, calc. 7713
  - fast electrons in mag. field 8224
  - Cherenkov, theory 8451
- **scattering** see also *Beta-rays, scattering*
  - accuracy of Molière function 263
  - and positrons, relativistic, Coulomb scatt. by n 264
  - electrons and positrons, backscattering 265
  - 35 keV, in exchanges with atoms and molec energy losses 900
  - chromatic losses in passage through matter 901
  - positron-electron scattering 1682
  - by atom, symmetry requirements 2198
    - exchange scatt., inverse Auger effect 389
    - high-speed, form-factor 7047
    - integral eval., field theory appl. 7462
  - effect on Cs_3Sb photoelectron energy distrib. 24
  - fast, by charge Ze Coulomb field 3356
  - by electrons, theory 3357
    - at 6·1 MeV 3358
    - atomic, 1·3 MeV, electron/positron ratio 485
    - radiative, corrections 8223
    - 200–300 KeV 8446
  - by He ions, variational methods appl. 3359
  - from various potentials, calc. tables 3360
  - role in shadow-cast electron microscopy 3641
  - multiple, Molière's theory 3881
  - slow, by diatomic molecules, theory 4139
  - Oppenheimer approximation 4140
  - excitation of molec. rotation-vibr. 4255
  - neutron-electron magnetic scatt., orbital effect 5
  - in metals, non-elastic, resonance 5518
    - low-temp. thermoelectricity study 7690
  - simple derivation of Bhabha's formula 5519
  - by H, bound-state formalism 6462
  - exchange scatt. in a 3-body problem 6477
  - fast positrons by nuclei 6846
  - by He atoms, theory 6847
  - high-energy electrons, nuclear recoil separa 7722
  - radiative corrections, effect of damping, catastrophe 8222
  - single, by nuclei, cross-section meas. 150–400 8447
  - elastic, rel. to nucleus model 8448

Electro-optical effects
- Kerr effect, in Onsager liquids 1627
  - modified Silberstein model of optical anisot 1820
- Kerr cell camera shutter, electronically operated appl. to elec. discharge study 2133
- elec. double refract., liq., relax. time 3194

Electrophoresis
- interferometric meas. method 159
- electrical phenomena at interfaces (book) 866
- nonequilibrium thermodynamics 1651
- colloidal electrolytes, moving-boundary 3322
- photoelec. control of compensator 3323
- constant flow velocity problem in separation 4818

- **lectrostatics** see also *Electric charge; Electric fields*
  - new vector identity appl. 206
  - potl. produced by 2 point current sources in sphere 825
  - elementary non-conservative electrical system 2430
  - conductor capac. calc. 3281
  - anodized Al condenser, water vapour effect 3285
  - electrical phenomena in adhesion 4433
  - potl. distrib., homog. spheroid, internal source and sink 4782
  - anisotropic bodies in electric field 6744
  - charged disk in conducting box 6746
  - triboelectric props. of polyvinyl chloride 6747
  - frictional electrification of polar polymers 6749
  - interaction of layers in BN 7815
  - atomization of liquid by electric field 8262
  - analyser for aerosol total charge and mass meas. 8744
- **lectrostriction** see also *Piezoelectricity*
  - vibration, substitution of magnetostriction theory 1626
- **lementary particles** see *Fundamental particles*
- **lements**
  - photoconductivity and related effects (book) 234
  - max. age, and earth's crust age 3765
  - bibliography on americium 4969
  - critical properties of 17 elements, bibliog. 6714
  - **origin** see also *Cosmogony; Thermonuclear reactions*
    - time of formation, from Pb isotopes rel. abund. var. 2093
    - expanding universe and galaxies, theory 4559
    - evolution in a galaxy 6385
    - report of conference papers 6437
  - **relative abundances**
    - cosmic, table prepared from meteorites data 10*
    - conference report 6437
    - certain elements conc. at earth's surface 8121
- **missivity**
  - CO_2, at high pressures 722
  - spectral, graphite and carbon 5370
- **mulsions** see also *Colloids*
  - scattering of sound 1465
  - Li soap-oil dispersions, fine struct. rheolog. props. 3691
  - flotation reagents, emulsification by u.s. waves 3957
  - elastic and viscous properties 7255
- **nergy levels** see *Atoms, structure; Molecules, internal mechanics; Nucleus, energy levels; Spectra*
- **ntropy** see also *Thermodynamics*
  - as measure of quantity of information 636
    - of continuous message system, defn. 1334
    - survey of theory 6495
  - initial behaviour of spherical blast 678
  - minimum production, states in continuous systems 823
    - in electrochem. reactions 5164
    - comments on theory 4068
  - melting, crystallite liquid theory formula 1420
  - production in dilute system irreversible processes 1596
  - macroscopic emitter + free photons 1599
  - and organization concept 1600
  - of activation in metallic diffusion 1962
  - changes in free radical reactions 2778
  - rel. to disorder in metal melting 3003
  - electrons in metallic lattices 3477
  - variation during emission of photons 4780
  - Meissner's principle verification in Couette flow 5883
  - in nonequilibrium thermodynamics 6739
  - gas imperfection, as cluster model test 7513
  - **properties of substances**
    - of solution, nonelectrolytes 66
    - charts for water-ammonia soln. equilib. phases 5449
    - gases and vapour-forming compds., calc. 6027
    - gases in equilib. or reacting, isotopic substitution effect 8004
    - ammonia, liquid 824
    - diacetylene 196
    - Ba titanates 3267
    - decaborane 1009
    - CO, 0 to 150°c up to 3000 atm. 2428
    - CS_2 organic mixtures, effect of press. 3922
    - CeMg nitrate, below 1°K 7631
    - ClF_3 203
- **Entropy**—*contd.*
  - **properties of substances**—*contd.*
    - diamond, low temperatures 5446
    - GeF_4 197
    - He^3, liquid 2415, 3254, 8372
    - ice, residual entropy 7014
    - Mg titanates 3268
    - methanes, substituted ($CHClBr_2$ and $CDClBr_2$) 1804
    - NpO_2 3273
    - Se, crystall. low temp. 6736
    - Na vapour, from spectroscopic data 1597
    - Sr titanates 3267
    - Teflon tetrafluoroethylene resin, fusion 818
- **Epitaxy** see *Crystals, faces; Crystals, growth*
- **Equations** see also *Differential equations; Integral equations*
  - telegraph, soln. with supersonic shear flow appl. 3
  - quantity eq., rel. to rationalization of units 8201
  - **algebraic**
    - in numerical analysis (book) 576
- **Equations of state** see also *Thermodynamics*
  - Lennard–Jones and Devonshire, at high temps. and densities, tables 200
  - thermal, for gases and fluids 821
  - metals under v. high press., TFD function deriv. 5869
  - calc., fast computing machine method 6026
  - monatomic fluids, radial distrib. function calc. 6741
  - linear piezoelectric eq. of state 6763
  - deviations from corresponding states principle 7646
  - at low temp. (book) 8366
  - amorphous long-chain polymers, comparison of eq. 8751
  - **gases**
    - neopentane 74
    - Kr 75
      - virial coeffs. 76
    - low temp. 2nd virial coeffs., 6–9 potl. 664
      - Lennard–Jones gas 665
    - vol. expressed in press. and virial coeff. terms 1598*
    - virial form, in terms of clusters integrals 2259–60, 5903
    - imperfect gas, liq. drop model 4069
    - Lennard-Jones and Devonshire, quantum correction 4659
    - 2nd virial coeff. of organic molecules 4660
    - new eq., comparison with expt., CO_2 4778
    - apparatus for high temp. study 5330
    - coeff. of fugacity of sat. vapours 5447
    - density and press. virial coeffs., rel. 6551
    - law of corresponding states 8277
  - **liquids**
    - ethyl alcohol 822
    - free volume, for hard spheres 1422
    - from virial function 2236
    - monatomic liquids, general props. 2238
      - radial distrib. function calc. 6741
    - dipole liquids 5893
- **Erbium**
  - some magnetic and elec. props. 8554
- **Erbium oxide**
  - Er_2O_3, paramag. neutron scattering 8527
- **Errors**
  - standard, in fitting polynomials to unequally spaced observations 5827
  - **astronomical**
    - systematic, in equiv. width spectrophotometric det. 5950
  - **theory** see also *Measurement, errors; Random processes*
    - in servomechanism theory 578
    - dispersion on a sphere, appl. 5229
    - in determ. parameters of experimental law 7378–9
    - fluctuation theory in measurement, review 8199
- **Ethane**
  - magnetic rotativity 1231
  - 3rd virial coefficient 1438
  - Hg-photosensitized oxidation 2021
  - u.s. velocity var. near critical region 7524
- **Ether**
  - decomposition theory 7230
- **Ethyl acetate**
  - hydrolysis, rate affected by sound 5746

Ethyl alcohol
  heat capac., gas imperfection, i.r. spectra and internal rotation barriers 822
  and water, mixtures, u.s. absorpt. 2268
  as G.M. counter quenching agent 3375
  dielec. const. meas., u.h.f. 7660
  dielectric relaxation below — 147°C 8391
Ethyl bromide
  dissoc. by neutron capture 1223
Ethyl iodide
  dissoc. by neutron capture 1223
Ethylene
  reaction with Hg($^3P_1$) 1210
  3rd virial coeff. 2259
  as G.M. counter quenching agent 3375
  electronic spectrum and struct. theory 3508
  W log p diagrams 4065
  potential functions 4248–9
  meas. of Joule–Thomson coeff. 6550
  calculations on mol. structure 7015
  exchange reactions at surfaces rate 7235
Evaporation see also *Vaporization*
  damage to optical flats during 173
  evap. metal films contamination by source matl. 484
  rate, rel. to pressure 1425
  liquid drops into gas stream 1581
  of substrate through monolayers 2795
  vacuum, meas. of rate 3020
  in vacuum still, relative volatility meas. 3021
    "working" and "torpid" areas 3022
  raindrops, while falling 4506
  convective, fluid mechanics and applications 4761
  Ge, from carbon crucible 5439
  molecular, of group IV B elements 5524
  metals, shadow-casting, contam. with W 6258
  of KCl crystal faces 6709–10
  from C surface, C_3 in vapour 7644
Examination of materials see *Electron diffraction examination; Electron microscope examination; X-ray examination*
Exchanges, chemical
  Na^{22} separation from Mg, ion-exchange method 498
  D between NH_3 and H, equilib. 1999
  ion exchange mech. and isotherms, deep bed performance 2000
  isotope separation, rectification problem 2627–8
  isotopic, I ion and organic iodides, kinetics 3677
    between O and water, catalysis 7057
    modified rate expression 8729
  ion-exchanging surfaces in radiological decontamination 4334
  adsorpt., clay minerals, thermodynamics 4436
  two reactions involving diborane, kinetics 4444
  surface area of powder by ion exch. 4629
  mathematics of column processes 7228–9
  ethylene reactions at surfaces, rate 7235
  radiochemical microdosage of Cl in ZnS phosphor 8030
Excitation see *Atoms, excitation; Molecules, excitation; Nuclear excitation; Vibrations, excitation*
Explosions see also *Detonation; Shock waves*
  2nd explosion limits, withdrawal-rate effect 501
  multiple scabbing of metals 1163
  thermal, Poisson–Boltzmann eq. soln. appl. 1207
  CO, effect of water vapour 1208
  under-water, high-speed photog. 1324
  H–O reaction sensitized by NOCl 2006
  effect on metal surface, photog. study 2749
  initiation and growth, liquids and solids (book) 2780
    size effects 8735
  acetylene combustion, kinetic spectroscopic invest. 3246
  spectral and pressure observations 5152
  spont. explosion limits, cyanogen–air mixt. 5744
  inflammability by high-intensity radn. 6295
  in acetylene/air mixt., spherical waves 7236
Extra-terrestrial radiation see *Cosmic radiations, r.f.; Sun, radiation*
Eye see also *Vision*
  directional scattering of light by retina 571
  peripheral dark adaptation 2110
  human, accuracy and sensitivity, mech. 2114
Eye—*contd.*
  multibeam ophthalmoscope for retinal ph study 2115
  flicker expts., elec. analogue 2862
  method of studying cornea shape 3965
  foveal vision, effect of light spot on sclera 4526
  crystalline state of red-absorbing pigments 453
  stray light response in electroretinogram 5815
  light adapted, electrical responses 5816
  fovea spectral sensitivity, neutral adaptation 58
    chromatic adaptation 8144
  response to polarized light 8141
  rabbit's, crystalline lens i.r. absorpt. 8142
  sensitivity to X-rays, meas. 8143
F-centres see *Colour centres*
Faraday effect see *Magneto-optical effect*
Fatigue see *Elastic fatigue*
Ferro-electrics see *Dielectric constants, ferro-elec Piezoelectricity*
Ferromagnetism see also *Magnetic properties; netism; Magnetization*
  GdMg alloys 318
  antiferromagnetism, of atoms on different l sites 319
    mixture of states in wave functions 4205
    $CuCl_2.2H_2O$, radiowave spectroscopy 5385
    and ferrimagnetism, review 6131
    in MnF_2, FeF_2, CoF_2, NiF_2, neutron dif studies 6132
    Cr_2O_3, neutron diffraction study 6136
    review 6932
    structure deformations in CoO and MnTe 80
    CrSb mag. mom. orientation and thermal ex sion 8357
    of CrSb, rel. to cryst. struct. 8528
    new results 8532
    resonance at 0°K rhombic crystal 8539
    resonance, $CuCl_2.2H_2O$ 8540
    resonance when Curie point well above 0°K 8
    hexagonal Fe oxide compds., saturation mag zation at 0°K 8542
    anisotropy of Fe-group fluorides 8546
  resonance, spin-spin relaxation 953
    in ferrites at low and high temps. 4212
    in ferrite single crystals 4214
    in Cr–Te alloys 5566
    in parallel wires 5567
    energy absorption 6133
    magnetic spectra of ferrites 8535
    relaxation effects 8538
    antiferromagnetic, at $T = 0$, rhombic crystal
    ditto, $CuCl_2.2H_2O$ 8540
    ditto, Curie point well above 0°K 8541
    using "common radiator" 8553
  effective magnetic distances in Fe group substa 957
  ferrite mag. spectrum temp. dependence 959
  hexagonal iron–oxide compds., preferred orienta effects 961–2
  Cr_2O_3 anomalous sp. ht. at antiferromag. C temp. 1593
  internal friction, due to magnetization rotation Ni_3Fe 1756
    65-Permalloy and Perminvar, field-cooled 176
  Barkhausen effect, Si steel, statist. study 1760–1
    time interval distrib. 1762
  resonance absorption, microwave, Gd metal 2 8555
    ditto, Ni–Cd ferrites 4206
    ditto, Mn compds. 8551
    conductors, e.m. losses rel. to 984
    in antiferromag. matls. 4207
    magnetite single crystal 4208
    Ni ferrite, transition 4210
    anomalous, in Co- and Co–Zn ferrites 4211
  neutron diffraction invest., ferro-, ferri-, antife 3626
    antiferromagnetic fluorides 6132
    Mg ferrite ferrimagnetism, 6134
    antiferromag. structure in Cr_2O_3 6136
  Ni ferrite magnetic transition 4209
  Ni–Co alloys behaviour 4213
  saturation approach in dil. ferromagnetics 4215

romagnetism—*contd.*
- rel. to order in Ni–Mn alloys 4910
- and superconductivity, mutually exclusive? 6061
- Bitter figures on 3% Fe–Si alloys 6146
- domains, Fe–Si electron micr. invest. 6260
  - walls in Ferroxdure 8547
  - Si–Fe pattern under stress 8604
- Co compounds with perovskite structure 6938
- vanishing spontaneous mag. below Curie temp. 6941
- Ni and Zn ferrites, magnetic struct. 8526
- relaxation processes 8537
- particles, coercive force 8543
  - ferromag. powder, size meas. 7974
- thin Ni films, exptl. invest. 8544
- permeability tensor meas., ferrites 8548
- Si–Fe powder patterns, polycryst. and single crystal comp. 8549
- recent developments survey 8552
- ferromagnetic sponges, props. 8572
- Hall effect in ferromag. matls., theory 8599

heory
- 2-dimensional Ising lattices, statistics 315
  - rectangular, spontaneous magnetization 3427
- Heisenberg model 951
- spherical model of ferromagnet 952*
- binary alloys, saturation magnetization 954
- spin-lattice relaxation 1739–40
- origin, new quantum theory 1741
- ferromag. state struct. α–Fe and Fe alloys 1742
- Bloch wall, effective mass 1743
  - energy, band picture 3478
- spheroidal inclusions, effect on coercive force 1744
- antiferromag. resonance, above Curie temp. 1748
  - in $CuCl_2.2H_2O$ 3423
  - spin wave theory 3424
  - in rhombic crystal at abs. zero 6937
- 2nd-sound propag. conditions calc. 2420
- 3-dimensional ferromagnet, variational method 2534
- ditto, statistics 2535
- Zener's treatment, critical discussion 2536
- microwave permeability tensor and Faraday effect, nonsaturated matls. 2577
- antiferromagnetism, spin wave method, appl. 3425, 8518
  - and ferrimagnetism, review 1746
  - transitions between ferro- and 4202
  - superexchange interaction 8515
  - molecular field treatment, review 8517
  - Néel's theory in 3-dim. case 8539
  - Fe-group fluorides anisotropy 8546
- collective electron theory 3426
  - spin degeneracy 1738
  - overlapping energy bands 4203
  - atomic moment, alloys 8516
  - review 8523
- Néel's theory of coercive force 3429
- magnetic after-effect, mech. 4200
- spin waves in ferro- and antiferromag. matls. 4201
- atomic theory, new matls. appl. review 4204
- 2nd neighbour interact., reg. binary assemblies 4238
- linear antiferromag. chain, zero point suscept. 4902
- mixed Co and Mn oxides antiferromagnetism, molec. field theo. 4907
- single domain particles 5564
- metals, atomic vibr. effect on paramag. and sp. ht. 5607
- intrinsic magnetization, calc. 6929
- Ising model, review 6933
- satn. magnetization rel. to *d* electrons, Fe group 6934
- spec. ht. discontinuity in antiferromagnets and ferrites 6942
- semi-quantitative theory 8519
- analysis of magnetization curves, theory 8520
- exchange interactions, review 8521
  - external and internal electrons 4901
- energy band concept, review 8522
- exchange coupling models, ferromag. media 8524
- mag. props. of thin films 8544
- resonance absorption in Mn compds. 8551
- recent developments, survey 8552
- resonance phenomena, in ferrites 8570
  - Faraday effect appl. 8598

Fibres
- silk, small-angle interferences rel. to wax content 1180
- synthetic, drawing problems 1958
- small-angle X-ray scatt. study 1972
- quartz, stretched, straightness meas. appl. 2974
- synthetic, friction laws 3670
- textile, optical and electron microscopy 5127–8
- cellulose, diameters, elec. micr. and X-ray difference 5728
- Norelco spectrometer adaptation for X-ray diffraction study 8718

Field theory see also *Fundamental particles; Gravitation; Relativity, unified field theories*
- concept of free field 23
- Bopp-type non-local fields, energy-momentum tensor 27
- fields of zero rest-mass, conservation laws 29–30
- 8 families of operators, observables of spin $\frac{1}{2}$ particles, assoc. 41
- spin $\frac{1}{2}$ particles quantities, mean value densities rel. 42
- relativistic Fourier reciprocity and elementary masses 599
- divergence of transition probability 604
- contributions to field-mechanics 607
- tensors whose elements are Dirac matrices 613
- space, field and ether, review 1358
- equation of evolution soln. 1372
- connections between elementary particles 1373
- fermion types and selection rules 1382
- unified, with varying charge and rest-mass 2171
- unified field and general relativity, review 2172
- classical and quantum, in Lagrangian formalism 2177
- covariant, strong conservation laws and eq. of motion 2182
- bound states in central force field 2208
- action as co-ordinate of space 2925
- field of charged point-mass 2940
- Bopp's unitary theory, mass var. with velocity 2948
- zero rest-mass particles, spin 2950
- photic field theory 3082
- quanta conservation for nonlocal fields 3856
- commutation relations and vac. expectation values 3857
- new eq. in affine field laws 3858
- nonsymmetrical, the skew symmetric tensor 4591
- perturbation theory, divergence 4592
- proper Lorentz transformation of Dirac's eq. 4599
- two-boson system, parity and angular momentum 4601
- co-ordinate operators and fundamental lengths 4603
- space reflection, time reversal, charge conjugation, spinor fields 4604
- variational methods in collision and diffraction theory 5288
- corpuscles, geom. repres., and triple-wave method 5289
- predictions and triple-wave theory 5290
- resolutes of fundamental problems 5291
- nonlinear, signal propagation 5292
- Schrödinger's unitary, photon mass study 5293
- elementary review 5654
- description of bound states 5851
- fields modified by linear homogeneous forces 6449
- density matrix in the Hartree field 6453
- boundary conditions in mechanics of fields 6454
- action principles 6455*
- exchange forces in causal theory 6472–3
- divergence of perturbation theory 6481
- quantum hydrodynamics 6726
- regular, constructed in a finite space-time domain 7427
- transformation of variables in distrib. theory 7428
- renormalization in divergent series 7429
- diffusion-type eq. soln. in renormalization procedure 7439
- quantum theory, alternative formulation 7440
- particles, connection between spin and statistics 7445
- potl. det. from asymptotic phase, uniqueness 7464
- canonical, vibrating string app. 7520
- self-adjusting field method, nucleus appl. 7830
- Lagrangian formalism 8214
- selection rules imposed by charge conjugation 8215

Field theory—*contd.*
    conservation eq. for nonlocal field theories 8216
    Dirac–Corben eqn., note on solution 8227–8
    non-local, rel. to fusion theory of bosons 8230
    some consequences of gauge invariance 8232
  electromagnetic field   see also *Electromagnetism*
    consequences of invariance under charge conjugation 31
    β-matrix formalism as $\kappa \to 0$ 33
    longitudinal and scalar photons role 34
    non-linear electrodynamics, contrib. 35
    Dirac electron theory, pilot-wave and double soln. ideas appl. 43
    quantum electrodynamics, current density 608
      real and virtual processes 2187
      vacuum concept in 2188
      Green functions in 2945
      with auxiliary fields 2946
      convergence problem 3863
      deductions 3864
      perturbation approach 3865
      and classical, correspondence 7432
      de Broglie's photon, appl. 7434
    e.m. momentum and Newton's 3rd law 975
    in unified field theory modification 1359
    electrons, nature of mass and charge 1366
    electron theory modification 1368
    multi-electron problem, relativistic config. space formulation 1376
    Maxwell–Minkowski electrodynamics, energy-momentum tensor 1377
    conservation of charge 1394
    angular momentum in Dirac's electrodynamics 1767
    energy momentum tensor in Dirac's e.m. theory 1768
    similarity theory of relativity appl 2170, 7420
    deductions from least-action principle 2175
    divergencies, elimination techniques, review 2186
    gauge invariance and classical electrodynamics 2190
    electricity relativistic flow, Dirac's new variables 2191
    Born–Infeld electrodynam. and unif. field theory 2932
    generalized e.m. theory with double gauge invariance 2934
    Dirac and Klein–Gordon eq., Sommerfeld–Maue soln. 2947
    extended e.m. field 2966–7, 6457
    optics in generalized field theories 3859
    photon self-energy problem 3866
    unipotential many-electron problem, variational approach 4590
    classical electrodynamics, conservation laws 4594
    electromagnetic vacuum theory 4595–6
    integral repres. of field vector 6456
    new nuclear theory, Maxwell–Lorentz electrodynam. generalization 7027
    energy-momentum tensor of e.m. field inside matter 7435
    multi-stream, eqns. 7436
  interactions
    a field interaction Lagrangian 37
    covariant methods appl. to line shape problem 384
    amplitudes interference in cascade process 394
    Compton operator 609
    charge symmetry effect on nuclear reactions 612
    multiple processes 618
    final state, effect on reaction cross-sections 624
    Franck–Condon principle, crystals appl. 1247
    intermediate coupling, covariant generalization 1378–9
    bound states and the interaction representation 1380
    static, of leptons, due to de Broglie field 1381
    bound states, in weak interaction 1389
      theory of resonance reactions 4597
      in strong interaction 6462
    divergent perturbation expansion 1391
    β-decay, Fermi and Gamow–Teller rel. strengths 1890
    amplified Dirac eq. conversion to approx. relativistic form 2192*
    non-local, theories 2197
      Compton effect example 7438
      for particles and fields 7446
      conservation laws 8225
      comparison 8226

Field theory—*contd.*
  interactions—*contd.*
    3-nucleon, in Yukawa theory 2205
    ionization loss at relativistic energies 2492
    of second kind, existence? 2953
    isotopic spin and Coulomb forces 2957
    Møller's formula, radiative correction 3357
    universal, symmetry props. 3867
      Fermi-type 3868, 7451
    Compton scattering non-relativistic limit 3877
    high-energy particles (book) 4193
    Fermi term in β–ν correl. 4315
    β-decay matrix element radiative corrections 431
    pseudoscalar matrix element in β-decay 4317
    relativistic theory of resonance reactions 4597
    particle ensembles, statistical density 4598
    spin-orbit, and saturation requirements 4605
    an integral transform class in nuclear dispersion
    quantum theory of wave fields, limits 4611
    Fredholm scatt. theory, given time-dependent 4615
    Fermi function, numerical values 5295
    exchange potl. in electron gas, nonzero temp. 58
    Tamm–Dancoff method appl. 5854
    2-electron self-consistent field 5862
    pseudoscalar, in β-decay theory 5863
    Dirac theory of electron diffract., Huygh principle 6467
    spin-spin, matrix elements 6479
    elec. quadrupole, effect on γ–γ directional co 7103
    algorithm of Dirac spurs 7442
    particles with arbitrary spin rel. to regulariza 7444
    Bethe–Salpeter eq., 2-particle potl. 7455
    repulsive core and charge independence 8238
    nucleons in nucleus 8634
    Fermi type, in β-decay theory 8661
  interactions, particle/e.m. field   see also *Cheren radiation; Scattering, particles*
    vacuum polarization by spin 1 particles 32
    interaction of cohesive field 36
    free particle Dirac eq., physical interpretation 44
    Coulomb functions for heavy nuclear particles 6
    motion of slow electrons, polar crystals 1248
    electron g-factor, classical field mech. 1367
    photon scattering, interaction times lower limits 1
    radn. scatt., non-relativistic theory, rôle of spin 1
    nuclear dipole oscillations due to fast electrons 1
    electron-positron, coupled to unquantized field, canonical transformation 2189
    spin $n\hbar/2$ and $m\hbar/2$ particle Coulomb scatt. 2194
    multiple scattering and radiation damping 2207
    non-local interaction 2949
    Störmer problem, periodic orbits non-existence
    a logical quantum dynamics of electrons 3862
    bremsstrahlung prod., electron–electron collisi 3869
    Schrödinger eq. for electron in Coulomb field 38
    electron/lattice-vibrations, metals 4243
    spin $h/2$ and $nh/2$ particles, bremsstrahlung emiss 4602
    electron eigen-energy and radn. corrections 5294
    photon with matter field, wave-mech. potls. 5296
    relativistic equation of interacting particles 5298
    spin $\frac{1}{2}$ particle, central field with high-order pole 5
    matrix elements in radiative transitions 6466
    solution of eqn. of an electron 7437
    electron scatt. radiative corrections, damping 82
    electron scatt. by electrons, radiative corrections 8
    radiation by fast electrons in mag. field 8224
    self-stress theory, anal. 8231
  interactions, meson-nucleon   see also *Nuclear forces*
    relativ. 2-body problem, non-adiabatic treatmen
    the exchange current 47
    S-matrix and nucleon isobar 51
    nucleon anomalous mag. moments, Tomona Schwinger formalism 610
    electron-neutron interact. psc. meson theory 623
    charge-exchange scattering and classical str coupling 628
    charge-symmetric psc. mesons, scatt. 629

d theory—*contd.*
teractions, meson-nucleon—*contd.*
scattering and photo-production, psc. theory appl. 630
deuteron photodisintegration, high energies 1128
nucleon/μ-meson, coupling const. 1937
a convergent meson theory 2196
π-mesons 2956
    pairs generation 611
    scatt. by protons, Coulomb effects 1935
    nucleon scatt., weak and extended coupling 2203
    capture by deuterons 3619
    interactions with nucleons and photons, conf. 4337
    interaction with nuclear matter 4338
    210 MeV π^--mesons in emulsions 5109
    elastic scattering in *d* 5857
    scatt. by nonrelativistic nucleons, 4th-order corrections 5859
    non-adiabatic scattering 8235
    perturbation method anal. 8489
charge independence evidence 3621
equivalence principle 3871
nuclear forces from psc. meson theory 3874
μ-meson, nuclear capture 4339
deuteron meso-disintegration interpret. 4340
V-particle model and meson-nucleon scatt. 4379
nucleons, anomalous magnetic moments 4609
in nucleus splitting by cosmic rays 5055
several mesons created in single collision 5300
scattering, recoil effects 5858
scattering, relativistic 2-body eq. soln. 5860
covariant meson-nucleon eq. 5861
sign of phase shifts 6222
fermion charge conservation 6470
eson field see also *Nuclear forces*
divergences arising from nuclear forces 28
generalized Furry's theorem for closed loops 45
meson current round nucleon 46
4th-order nuclear potential 50
    adiabatic 52
"infra-red catastrophe"—like divergency in meson theory 603
classical nonlinear theory, quantum corrections 619
neutron–proton interaction analysis 621
psc. meson theory, electron–neutron interact. appl. 623
final state interactions, effects 624
meson scattering by mesons 626
quantized theory of psc. mesons, appl. 630
action as co-ordinate of space 1362
Riesz potl., modified definition 1388
a convergent meson theory 2196
mesonic particle mass spectrum and subtractive fields 2200
μ-meson interaction with matter 2954
nuclear forces, review 2958
    and deuteron ground state 48
    meson theory 49
    pseudoscalar meson theory 54
    symmetric pseudoscalar theory 622, 3875, 5855
    higher order corrections 2202
1st-order wave eq. 2961
π^--radiative capture by deuterons 3612–13
non-local theory 3872
new quaternion approach 3873
pseudoscalar, neutron-proton scatt. calc. 3878–9
    neutral, non-adiabatic method 7449
    spin-orbit coupling 7457
    radiative corrections 8237
nuclear properties, mesonic interpretation 4610
virtual nucleon-pair formation damping 4613
strong coupling psc., nuclear stability 4963
Feynman's method for spin-one charged mesons 5299
spin-orbit coupling and mesonic Lamb shift 6172
scalar pair theory 6458
non-linear mesodynamics 6471
energy in the nuclear field 7452
convergence of adiabatic nuclear potl. 7458
charge symmetrical theory, eq. of motion, particles, appl. 7461
field energy localization and meson production 7960
some consequences of gauge invariance 8232
quantum theory of wave fields 8233

Field theory—*contd.*
quantization see also *Quantum theory*
    4th-order vacuum polarization 606
    impulse approx. and field theoretical calc. 620
    quantum-mechanical operators, meas. 1374
    reversal of motion 1375
    classical spin theory quantization 1386
    two types of occupation number repres. 2183
    primitive, in relativistic 2-body problem 2184
    two quantized fields thermodynam. props. 2185
    phys. quantities possible in quantized universe 2941
    quantized operator calculus 2942
    operator calculus appl. 2943
    bound states, relativistic integral eq. 2944
    elementary particles, V^0 appl. 3860
    generalized quantization method 3861
    free electrons in unitary quantum electrodynam. 4593
    2nd quantization and configuration space 6459
    damped elec. oscillator appl. 6460
    gauge transformations in electrodynamics 6461
    divergencies, interacting fields, model 7426*
    in regular field theory 7427
    quantized fields, theory 7430–1
    methods appl. to statistical mechanics 7470
    commutation laws 8217
    convergence in the intermed. representation 8218
    non-local field eq., bound states, Yang–Feldman formalism appl. 8219
Films
    gas, electrolysed, limiting thickness for neg. press. 6548
liquid see also *Adsorbed layers; Contact angle; Surface tension*
    He II, transport over Cu, below 1°K 191
        flow in cryostats below λ-point 1587
        formation 4060
        optical method study 4061
        bulk liq. formation 4765
        transfer rate near zero level difference 6010
        Bose–Einstein condensation 7635
        adsorbed film thickness 7636
        anomalous surface tension 8368
        adsorption on glass 8369–70
    supersat. solns., for cryst. particles detect. 657
    film boiling termination mechanism 793
    oil, formation in gears, elec. resist. study 1200
    bubble films, stability, surface transport role 1418
    water, abnormally low dielec. const. 1607
    He, unsaturated, review 5440
        thermodynamics 6009
    moving, invest. of instability 6523
    metals on solid surfaces 6526
    bursting, formation of condensation nuclei 7355*
    monomolecular, Devaux trough meas. 8261
solid see also *Membranes; Optical films; Thickness measurement*
    optical properties, Al absorpt. coeffs. 142–3
        metals, dispersion, photog. meas. 157
        metals, photoelec. det. 158
        metals, elliptical polarization of light, photoelec. anal. 168
        metals, Russell effect on photog. plates 575
        reflecting power meas., vac. u.v. 777
        Au and Ag, ultraviolet 2318
        multi-layer, reflection and transmission 2381
        absorbing, simultaneous det. thickness and opt. const. 3177
        multiple, reflected light phase shift 4039
        thick Au, Pt, Cr 4737
        PbS on sapphire, and photoelec. props. 5393
        NO, absorpt. spectrum, 2400 to 1600Å 5394
        absorbing layer refract. index meas. 6668
        Al and SiO, transparent in far u.v. 7582
        thick Rh, Be, Ni, reflecting powers in Schumann region 7605
        semiconductivity, effect of light on refract. index 8308
        Al_2O_3, refractive index and thickness 8309
        v. thin metal films indices and thickness, new method 8343
    evap. metals, electron mean free paths 214

Films—*contd.*
  solid—*contd.*
    elec. properties, evap. Cu and Ag resist. rel. to bulk resist. 214
      Pt, covered with dielec. layer, conductivity 218
      CdO, conductivity and structure 224
      anodic Ta_2O_5, photoconduction 233
      Ag on Ta, Ba on Ag, contact potl. meas. 826
      Mo, resist. kept constant by SiO film 1177
      ZnO, absorbed O influence on conductivity 1632
      Fe, mag. field effect on resist. 3318
      evap. Te, resistivity 4084
      PbS, Te, resist. freq. dependence 4093
      evap. metals, conductivity phenomena 4797
      oxide, electrolytic, on Al, ionic current 5125
      PbS on sapphire photoelec. props. 5393
      Tl and Sn, low temp. deposited, supercond. props. 5476
      very thin, metallic, Ohm's law deviations 6764
      thin oxide on Al, electron currents 6772
      conductivity in mag. field 6808
      v. thin metal, resist. rel. to voltage 7666
      Bi on glass, photoelec. effect 7681
      In and Tl, superconducting props. 7684
      Sn, superconductivity meas. 7685
      Te/metal film thermocouples 8381–2
    effect on emission, monatomic Th, Cs, Ba films 297
      Cu and Ag, on sec. electron emission 2494
      tarnish, on metals, effect on field emission 6079
      on metals, assoc. with sec. electron emission 6100–1
      oxide, on W and Ta 6102
    prep. by evaporation, contamination by source matl. 484
      evap. on optical glass, damage caused 173
      Cu and Ag with reproducible props. 214
      uniform metallization 1176
      Ge, from carbon crucible 5439
    bonding of thin films 496
    unbacked thin films 1178
    adherent, in electrolytic polishing, cleaning by cathode spraying 1217
    structure, Ge growth on rocksalt 1239
      Ag halide, oriented, decomposition 1966
      evap., metal, anisotropic lattice distortion 1968
      Sb, As, Bi, changes due to electron beam 1974
      Mg, Zn, Cd, molec. beam condensation 2078
      CuAl, vac. evap., elec. diffract. study 3642
      oxide, on Zn crystal, effect on creep 3669
      HgCl electrodep. on Hg 3713
      Ni, annealing of stresses, rel. to vacancies 3724
      dislocations and boundaries, interaction 4480
      Al, effect of vapour incidence 5126
      deposited layers, electron microscope analysis 5136
      Cu, Ag, Au, Al, on Cr on glass, epitaxis 5770
      hydroxide, on Mg, Al, Fe, Cu, electronographic invest. 6255
      ZnO on Zn crystals 6307
      vapour deposits, crystal orientation 7198
      Al–Ag, thin single-crystal layers 7199–200
      Au, Pd, Au–Pd, grain size 7971
      Cd, Zn, electron microscope study 7972
      polymer, X-ray diffraction patterns 7976
      linear growth in tarnishing reactions 8049
      transition, on glass surfaces, rel. to alk. content 8154
      Sb, amorphous, structure 8715
      evaporated, structure loosening 8717
      surface layer on quartz crystals 8764
    thickness meas. with Köster interference prism 1558
    high polymer, nuclear physics appl., prep. 1967
    adsorbed hydrocarbon cause of polished surface electron diffract. patterns 1976
    oxidation, selective, of alloys 1977
      thermal amorphous layer on Sn 2756
      oxide layer on metals, formation 3637
      Fe, effect of oxide layer 4456
    replicas appl., Au and Al for metal surfaces 2760
      optimum thickness for shadow-cast microscopy 3641
      Ti, evap. on to glass surfaces 6256
      evap. through nozzle, contam. with W 6258
    properties of metallic surfaces (symposium) 4400

Films—*contd.*
  solid—*contd.*
    collodion, deoxyribonucleic acid, Al, Au, radn. induction by α-particles 4449
    molecular, ϕ_1 on W, adsorpt. isotherms 4452
    symposium on practical methods 5124
    Rh, Pt, Pd, W, efficiency as catalysts of CH_3 an reaction 5159
    contaminating electrodes of electron microscope
    high polymer, electron emission in stripping f glass 7709
    ferromagnetic, mag. props. study 8544
    Ni, sorption properties 8747
Filters
    membrane, electron micrograph of pore system
    filtration-flow problems, practical solns. 6513
Filters, optical see also *Absorption, light; Optical fil*
    interference, types and applications survey 160
      used as phase plate 3207–8
      lamellar reflectivity calc. 4037
      multi-layer dielec. films, resolution 4738
      S-matrix poles 6671
    for i.r. spectrometry, review 730
    and antireflection coatings, design 764
    survey, including u.v. and i.r. 765
    coloured Perspex for darkroom lights 1539
    colour matching, for Macbeth illuminometer 230
    birefringent, design data 2361
    u.v. filters (book) 2394
    for standard white light source 3964
    for filter spectroscopy 3980
    variable i.r. filter 4720
    narrow pass band, survey 8326
    dichroic, effect on colour contrast 8349
Fission see *Nuclear fission*
Flames see also *Spectra, flames*
    "cracking," local monochromatic absorpt. det. 1
    propagation in CO 185
    development from elec. spark, schlieren study 18
    HBr, rotational and vibrational flame temps. 739
    Bunsen burner, review 803
    nonhomogeneous, radiant energy emission absorpt. 1489
    OH apparent rotational temps. study 1490
      diluted flames 2410
      self-absorpt. effects 6718
    CH rotat. and vibr. temps. 2409
    ethylene oxide decomp., velocity 3247
    flame front hydrodynam. stability 3248
    H from flames, septum permeation 3635
    H, containing alkali metals, reson. radiation 4003
    laminar, differential eq. governing 4441
    cyanogen-air, spontaneous ignition 5744
      long-delay, kinetics 5745
    spectrophotometry, review 5941
    similarity, law of, and propagation 6004
    burning velocity measurements 6716
    hydrogen-fluorine flame temps. 6717
    propagation, review of current theories 6719
    slot burner method for combustion wave instabi 6720
    spectrography and photometry 7549–50
    stationary flames, structure, etc. (book) 7627
    stabilized cellular, deformation studies 7628
    atom and free radical detect., mass spectrome technique 7629
    diethylether and O, mass spectroscope kinetic stu 8009
  sensitive
    coal gas and H, in u.s. detect., comparison 696
Flares, solar see *Prominences*
Flocculation see *Sedimentation*
Flow see also *Diffusion; Jets; Plastic flow; Viscosi Turbulence*
    laminar parabolic, stability 61
    fluid dynamics (book) 640
    heavy perfect fluid, uniqueness theorem 641
    viscous fluid problems, jet from plane wall 642
    rheoelectric study of infiltration problems 648
    plane Poiseuille, stability 1408, 7486
    generated by sound field, theory 2266*
    periodic, through circular orifices 2277
    generalized fluidity power law, extension appl. 27

A complete list of the Subject Headings will be found at the end of the Index.

w—*contd.*
  boundary-layer theory, reducible non-linear diff. eq. 4552
  basic methods in transfer problems (book) 4653
  convective, in porous medium, theory, variational form 6706
  flow law of ice 8808
ases see also *Anemometers; Aerodynamics; Supersonic flow*
  molecular, influence of binary collisions 80–2
  high-efficiency control device 524
  in tube containing heat source, aerothermodynam. invest. 671
  Ranque vortex tube invest. 808
  radial, between parallel planes 1407
  turbulent, longitudinal and time correl., comparison 1431
  skin friction in turbulent boundary layer 1432
  burning gas efflux, sonic vel. transition 1433
  method for simultaneous vel. meas. and sampling 1435
  2-dimensional dynamics, hodograph eq. transformation 3024
  interferometer study, accurate fringe shift meas. 3179
    Erdmann interferometer, theory 3180
  tables for calculations (book) 3927
    air flow (book) 659
    high-order hypergeometric functions 4654
  past prolate spheroid 3929*
  acoust. radn. from velocity field 3951
  subsonic, velocity field det. 4655
  3-dimens., subsonic, D'Alembert's paradox and moment formula 4656
  boundary layers and upstream influence 4657
  velocities, composite distrib., due to molec. agitation 4662
  drag on cylinder, low Reynolds numbers 5901
  round slender bodies 5329
  air and CO$_2$ in tube near critical point, exp. invest. 6535
  with heat production, rel. to isotropic flow without 6544
  meas. by compression into closed container, theory 6693
  past cylinder, asymptotic behaviour 7507
  boundary layer on rotating body 7508
  one-dimensional, unsteady motion, soln. 8184
  I^{131} vapour as tracer 8269
quids see also *Double refraction, flow; Hydrodynamics; Superfluidity*
  linearized, 1-dimensional, integral variants 1327
  plane, permanent, irrotational, uniform at infinity 1409–10
  turbulent, vel. fluct. meas. 1411
  compared with analogous solid props. 2237
  transport processes, theory 2239
  between parallel plates, heat transfer 2404
  non-Newtonian fluids, flow curves direct det. 2990
  compressible viscous fluids, unsteady 3902
  electrically conducting, parallel flows stability 3903
  spherically bounded, Stokes's stream function 3904
  viscous, conducting fluids, mag. field effect on stability 3905
  critical Reynolds nos. calc. 3907
  actual trajectories of fluid particles 4637
  between 2 rotating coaxial disks 4638
  along plane, transition to turbulence 4639
  assoc. with acoust. waves, rel. to acoust. intensity 5352
  viscous, activation energy 5875
    anomalous, v. low shear 5877
    discontinuous potl. flow as limiting form 5881
  Couette, plane, stability of limiting case 5882
    Meissner's entropy principle verification 5883
  predetermined rate, control method 5887
  non-permanent filtration flows, practical solns. 6513
  discontinuous, past a circular cylinder 6515
  inclined conduit, resist. effects on stability 6516
  viscous, incompressible, variational principle 6740
  forced, of rotating viscous liq. heated below 7485
  plane Poiseuille, stability 7486, 1408
    pipes
  inert, definition and props. 2230
    in Lagrange variables 2231

Flow—*contd.*
  liquids—*contd.*
    pipes—*contd.*
   viscous fluid, spherical obstacle 3906
   tube flow with slight angular momentum 5879
   dispersion of soluble matter 6530
Flowmeters see also *Anemometers*
   e.m. induction method for turbulent vel. fluct. 1411
   skin friction, surface tube meas. 1432
   for vacuum technique 2253
   electromagnetic, adjustment without stopping flow 2995
   float type, airflow, for agricultural grains 6547
   water flow meas. Te wire method 8254
Fluctuations see also *Brownian movement; Random processes*
   of particle nos., charac. in Coulomb interaction system 634
   statistical, in radioactive phenomena 1043
     in atmosphere, refractive index effect 1302
     in ionization by 31·5 MeV protons 3388
   Brownian, of coupled galvanometer system 3296
   signal-to-noise ratio appl. to photog. graininess 4544
   shimmering star observation, rel. to objective dimensions 6384
   theory, in physical measurements, review 8199
  electrical
   narrow band noise after nonlinear device, probability density 212
   discrimination against noise, scint. counters 278
   diodes, noise power spectrum rel. to electron stream conductance 288
   in linear systems, servomechanisms appl. 578
   information theory, optical analogy 725
   interaction with barrier layers in 3-electrode transistor 853
   in Si and Ge mixers, rel. to theory 855
   current noise, semiconductors 1634
   excess thermal noise (BaSr), oxide coating 1711
   non-linear oscillator disturbance, power spectrum 1769
   meas. on thin PbS photolayers 2448
   in neg. ion beams 2509
   Mo, Schottky effect, periodic deviations 2517
   background noise in pulse amplifiers 3382
   pulsed carriers detect., statist. criteria 3794
   shot noise, in semiconductors 4095
     in Ge filaments 4099
     in gas discharges 4127
   electron tube flicker effect 4173
   low-frequency, electron tubes meas. 4174
     electrometer tubes 4175
     semiconductors 4800
     thermionic emitters, temp. dependence 6908
   mechanism in insulators 4793
   surface layer noise, semiconductors 4806–7
   differential law, infl. of skin effect 5466
   contact noise in semiconductors 6043
   damped elec. oscillator and noise, field quantization appl. 6460
   in superconductors 6803
   space charge waves in electron streams 6965
   in physical measurements, review 8199
   contact noise temp. dependence 8417
   flicker effect theory, rectifiers 8420
Fluorescence see *Luminescence*
Fluorescent screens see also *Luminescence*
   uniform, nonhydrogenous, of ZnS-type phosphors 148
   Na salicylate, with photomultipliers, in vac. u.v reflection meas. 777
   fluoroscopic images, electronic intensification 1319
   coatings with polyvinyl alcohol binding 2366
   Lucite-bonded, α-scintillation, performance 2370
   phosphor adhesion mech. 3162
   semiconductor, electroluminescent, as transient voltage indicator 6667
   monolayer, of close packed phosphor grains 7584
Fluorine
   liquid, viscosity, density and surface tension 1404
   viscosity and molecular effective dia. 3017
   dissociation energy 3491, 6641
     by explosion method 6159

A complete list of the Subject Headings will be found at the end of the Index.

Fluorine—*contd.*
  molecule, excited states, unified orbital theory 6164
  H–F flame temps. 6717
  gaseous, intermolec. force constants 6983
Fluorine oxide
  excitation by collision, calc. 5612
Fluorite
  colour centres 8777
Foams see also *Bubbles*
  stability, surface transport role 1418
Fog
  supercooled, microstruct. and artificial precipitation 2847
  nuclei, electron-microscope study 5244
  absorption of sound, calc. 5344
  transmission of light, 4320 Å to 9500 Å 5803
Force measurement see also *Dynamometers*
  instr. for 10 to 12 000 mg weight range 4632
Formic acid
  thermodynamic properties 199
Fourier analysis see also *X-ray crystallography, analytical methods*
  transient waveforms, photomech. wave analyser 84, 8177
  optical, in crystallography, improvements 1257
  application to photographic images 1323
  photographic recording, images appl. 2871
  stochastic processes 4556
  simple method using galvanometer 6375
Fourier integrals
  in multiple scatt. peaked angular distrib. calc. 3783
Fourier series see also *Transforms*
  methods of summation 3782
  mechanical synthesizer 6374
  summation, Dirac delta function appl. 6376
  cryst. struct. anal. appl. (book) 7319
  maxima location, statist. method 8089
  optical representation in cryst. analysis 8091
Fractionation see *Distillation*
Fracture see also *Breaking strength*
  calcite cleavage faces behaviour 1161
  cracks due to shocks, refraction and velocity 1950
  concrete, mechanism 1951
  metals, stochastic theory 1952
  transition from ductility to brittleness, stochastic theory 1953
  glass, influence of temp. 1987*
    max. vel. of crack propagation 3662
    propagation in rods 5144
    extent of cracking rel. to resistance 7999
    influence of humidity 8000
    cut under liquids 8714
  photoelastic study 2391
  initiation by accumulation of vacant sites 3664
  ditto, observations on brass 3665
  fatigue tests, statist. interpret. 4425
  metal fatigue, struct. changes 4426
  fatigue, from stochastic theory standpoint 4428
  crack production, quartz, by thermal trans. 5203
  causing transformation of retained austenite 5730
  cracks, influence on mech. props. 5738
  starting point, LiF crystal, optical invest. 5739
  reversible and irreversible cracks in solids, theory 6244
  fatigue cracks, growth 8001
  C layers, flaking thickness 8713
  Zn single cryst., cleavage fracture 8724
Francium
  chromatographic separation 5190
Freezing see also *Melting point; Supercooling*
  He II solidification curve 189
  spont. nucleation of supercooled water 2243
  spontaneous, supercooled drops 3013
  supercooled water in glass 3236
  spectrum, significance in drop supercooling 4763
  cryometric law from Clapeyron relations 5438
  solidification point det. apparatus 5999
  app. for f.pt. diagram det. 6000
  nuclei, formation in frost-supersat. region 7356
Friction
  rolling, mechanism 1996
    tops' peg tracks effects 2216
  rising of tops, due to 2215
  influence on motion of tops 2217

Friction—*contd.*
  metallic, surface, solid solubility effect 2773
  Bowden's stick-slip lengths, rel. to m.pt. 2774
  in synthetic fibres 3670
  nature of coefficient 3671
  influence of surface films 4400
  sliding of hard bodies on ice 6278
  rubber, velocity and temp. dependence 7224
  at low temperatures 7225
  on snow and ice 7226
  Coulomb, with several blocks 7476
  static and dynamic coeffs. for various metals
    lubricants 8728
 internal see *Elastic losses*
Functions see also *Bessel functions*
  of >3 variables, nomogram 3788
  Dirac, use in mathematical physics 4551
    delta, in Fourier series summation 6376
Fundamental particles see also *Atoms; Field the interactions; Nucleus; Quantum theory; Scatte particles;* and individual particles, e.g. *Electr Mesons*, etc.
  concept of free field 23
  intrinsic parity, limitations 24
  spin-½ particles, quantities connected with, densi
      spinor form 40
    observables, 8 families of operators assoc. 41
    mean value densities rel. 42
    transformation properties of wave fns. 5297
    penetration through potl. barrier 5850
    new wave eq. 7441
  limiting concept of trajectory 99
  V-particles, nature 299
    possible models 462–3
    and τ-mesons theory 464
    composite? 465
    and nuclear phenomena 467
  at rest, structure theory 598
  quantum mechanics appl. (book) 602
  free 3-dimensional particles, relativistic theory 66
  Dirac electron zitterbewegung 614
  heavy nuclear particles, Coulomb functions 633
  connections between elementary particles 1373
  fermion types and selection rules 1382
  de Broglie theory of photon 1384
  nuclear, relativistic correction to mag. moments 1
  zero rest mass, spin definition 2950
  existence of second-kind interactions? 2953
  high-energy (book) 4193
  isobaric states of nucleons 4378
  empirical mass spectrum 4383
  unstable, mean life-time statist. estimate 4385
  quantum-statist. invest. of fund. processes 4588
  dynamics of spinning point particle 4600
  mass relation of heavy particles 4612
  corpuscles, geom. repres., and triple-wave met 5289
  predictions and triple-wave theory 5290
  in 5-dim. theory of electromag. and gravitation 6
  relativistic theory, 2nd quantization and config. sp 6459
  spin ℏ/2 and ℏ particles, wave eq. solns. as spher functions 6469
  interaction, and conservation laws 6470
  algorithm of Dirac spurs 7442
  with arbitrary spin, rel. to regularization 7444
  connection between spin and statistics 7445
  structure of mass spectrum, field theory 7448
  application of quantum theory 8211
  new neutral particle in cosmic radn. 8486
  in cosmic rays, new unstable, review 8488
Fusion see *Heat of fusion; Melting point*
Gadolinium
  metal, microwave reson. absorpt. 2537*, 8555
  thermal cond., low temp., mag. field 6698
  metal, magnetization props. and Curie pt. det.
  thermal expansion anomalies 7624
  some magnetic and elec. props. 8554
  Gd^{+++} magnetization studies, low temp. 8560
Gadolinium nitrate
  single crystal, paramag. reson. absorpt. 5569
Gadolinium sulphate
  low-temp. spin paramagnetism 970

Galaxies see also *Milky Way; Nebulae*
  spatial distribution, theory 2155
    large-scale, dispersion 2906
    specific model 3825
  double, radial velocities and masses 2156
  origin, expanding universe theory 4559
  line displacements and Lemaître's cosmological model 5271–2
  in cosmology, review 8183
Galena
  surface roughening and oxidation under reduced press. heating 7193
Gallium
  vapour, in disch. lamp 176
  atomic g-values, perturbations 386
  low temp. sp. heat, T^2 dependence 3271
  heat capacity, heat of fusion 3272
  compds. with P, As, Sb, semicond. props. 3298
  electrochemistry 5755
Gamma-ray spectra
  energies det. from β-ray spectroscopy and crit. X-ray absorpt. energies table 414
  continuous, accompanying β-activity 1073, 2665
  annihilation radiation, precision meas. 1084
  Döppler effect 1088
  neutron-capture, meas. methods 1138
    from elements $Z = 17$–30 and 45–57 1086
  pi-mu decay 2737–8
  influence on γ-ray transition effect 3571
  conversion line energies, β-ray spectrom. det. 5026
  $n + p \rightarrow d + \gamma$ 5035, 8684
  quantitative eval. from scint. meas. 5037
  positron annihilation in freon and O 7902
  even-even nuclei, patterns 8654
    rotational state data 6212
  heavy nuclei, low-energy proton excited 8676
  μ meson decay 8695
  Ag$^{106, 110, 112}$ 1053, 6201, 7071
  from Al low-energy p-bomb. 2672
  As$^{70, 71, 77}$ 3550, 7086, 7105, 8653
  Au$^{197m, 198}$ 4988, 5036, 6197, 7080
  Au^{198} precision meas. 1084
  Au, neutron-excess isotopes 1868
  Au^{198} K-Auger intensities 2677
  B^{11}, proton-bombarded 7898
  Ba$^{128, 131}$ 403, 7079, 7869
  Be neutron capture 1893
  Bi^{212} mag. dipole transitions 3548
  Br$^{77, 80, 82, 87}$ 1873, 5029, 7890, 8653
  C^{10} 7885
  C, neutron capture 1893
  C, μ-meson capture 5694
  Cd$^{113, 117}$ 4318, 7106
  Ce^{143} 1076
  Cl^{35} neutron capture 7106
  Co$^{56, 57, 58}$ 1067
  Co^{60}, precision 4323
  Co^{60}, Compton electron suppression 5048
  Co neutron-capture 2671, 7106
  Co^{60}, and 3·3 MeV d-d neutrons, discrimination 8707
  Cr$^{49, 51}$ 396, 7075
  Cr neutron capture 2670
  Cs$^{134, 137}$ 4995, 5036, 7889
  Cs^{137} precision meas. 1084, 3564
  Cs^{137} K-Auger intensities 2677
  Cs$^{133, 135}$ mag. dipole transitions 3548
  Cs isotopes 7867
  Cu^{67} 7877
  Cu$^{64, 66}$ neutron capture 2671
  Dy^{157} 5679
  F^{20} 1897, 5015
  F, proton radiative capture 3577
  Fe$^{55, 59}$ 1870, 5689, 5692
  Fe, neutron. bomb. 2670, 4365
  Ga$^{64, 65}$ 7073, 7078
  Ge^{75} 398
  Hf^{181} 4879
  I$^{126, 131}$ 1053, 1056, 4989
  I isotopes 7867
  following I^{131} decay 8665
  In$^{110, 112-14}$ 397, 2491, 4320, 4996
  ionium (Th^{230}) 7102, 7104
Gamma-ray spectra—*contd.*
  Ir^{192} 5684
  Ir^{192} precision meas. 1084
  K^{40} 1866
  La^{142} 7868
  Li^{7*} 8662
  Li^{7} proton-bomb. 8679
  Mg$^{26-8}$ 4324, 4997, 5676, 7876, 7892, 8651
  Mg low-energy p-bomb. 2672
  Mn neutron capture 2671
  Mo$^{90, 93}$ 1060, 4300–1, 7074
  N^{16}, search for 1-MeV 6202
  Na low-energy p-bomb. 2672
  Nb$^{95, 97}$ 2657, 3549, 3552, 5000
  Ni neutron-capture 2670
  Np^{240} 7874
  O^{14} 7885
  Os$^{185, 191, 193}$ 4995
  P^{33} 1132
  P^{32}, continuous, accompanying β-decay 2665–6
  Pa^{231}, conversion lines 1093
  $\mathrm{Pa}^{231} - \alpha \rightarrow \mathrm{Ac}^{227}$ 5691
  Pd^{112} 7071
  Po^{214}, cascades 8663
  Pm^{147} mag. dipole transitions 3548
  Pt$^{191, 193m}$ 4306
  Pu$^{239, 240, 241, 243}$ 1068, 1097, 4305
  RaB 5685
  Ra(B + C) 7098
  Ra(B + C), Compton electron suppression 5048
  RaC 4987, 6196
  RaC, invest. from Compton secondaries 5028
  RaD 1081, 2655, 4326, 7085, 7872
  RaD, conversion lines 7900
  RaE 4325, 7085
  RaE, continuous, accompanying β-ray 2665–6
  Rb$^{82, 84, 86-7}$ 1867, 1880, 2659, 7873
  Re$^{187-8}$ 4304, 6198, 7870
  Rh$^{104, 106}$ 404, 5675, 6199
  Rn, precision meas. 1084
  Sb^{124} 1053, 1083, 7081
  Sc$^{43, 46-8}$ 1075, 2671, 6200 7069, 7866
  Se^{75} 4999
  Sn^{125} 1082
  Sn^{113}, K-Auger intensities 2677
  Sr^{91} 7077
  Ta^{181} 7926
  Ta^{182}, precision meas. 1084
  Ta^{182}, Compton electron suppression 5048
  Ta^{181m} excited by bremsstrahlung 5693
  Tc$^{93, 96}$, isomene transitions 2660
  Te$^{123, 125, 131}$ 2652, 3548
  radio Th 7102, 7104
  radio Th, precision meas. 1084
  Th^{231} (UY) 1881
  Ti^{51} 1872, 4992
  Ti neutron capture 2670
  Tl^{208}, mag. dipole transitions 3548
  Tl^{204} 1069
  Tm^{170} 7067
  U$^{237, 240}$ 2656, 3551, 7874
  UX$_1$ and UX$_2$ 7088
  V$^{48, 50, 52}$ 2671, 7866, 8652*
  W^{187} precision meas. 1084
  Xe, isotopes 7867
  Y^{91m} 7077
  Y^{91}, continuous, accompanying β-decay 2665
  Zn$^{65, 69}$ 2661, 4990, 7070, 7871
  Zn neutron capture 2670
  Zr$^{95, 97}$ 2657, 3549, 3552, 5000
Gamma-ray spectrometers see also *Beta-ray spectrometers; X-ray spectrometers*
  curved-crystal, improvements and precision 1084
    improvement by (550) planes use 5038
  lens, for pair meas. 1900
  survey of techniques 5024
  energies meas. with pair spectrometer 5039
  scintillation counters (book) 6884
    double type 1053
    automatic recording 2673
    NaI, energy resolution up to 18 MeV 6109
    2-crystal, 0·2–1·3 MeV 6110
  spherical condenser-type, e.s. 7872

- **Gamma-rays** see also *Cosmic rays, photons*
  - β/γ ratio meas., roentgen units 1072
  - Döppler effect, 4·5 and 4·8 MeV 1088
    - meas. with high-speed rotary apparatus 4627
  - γ-recoil study, nuclear processes 1861
  - *E*3 lifetimes rel. to nucleon config. 1862
  - polarization, from O^{16} 1895
    - Cs^{134}, correlation 1087
    - from nuclei aligned at low temp. 1896
    - in 180° Compton scatt. 5696
  - γ-radiography techniques, appl. 2127
  - prod. by proton-γ resonances below 500 keV 2687
  - from μ^--meson capture, Pb 3562
  - low-energy, sources 4319
  - from Am^{241}, origin 4322
  - resonances in α-bomb. of Be and B 4346
  - cascade following Sc^{46} decay 4998
  - activity of atmosphere 5251
  - as 'rotation spectra' of heavy nuclei 5670
  - from $Mg^{24}(p, n)Al^{24}$ 5672
  - strength of electric dipole radiation for $3 \leqslant N \leqslant 38$ 5690
  - accompanying $Pa^{231} - \alpha \rightarrow Ac^{227}$ 5691
  - investigation by photoelectrons 6209
  - from $T(p, \gamma)He^4$, yield curve 6226
  - nomogram lifetime-energy-spin, γ-ray transitions 7099
  - Po^{214} coincidences 7110
  - from Io and RdTh 7102
  - sources for teletherapy 7117
  - ditto, shaped 4536
  - capture, from $Li^7(p, \gamma)$, energies and intensities 7891
  - neutron capt., from Mg, intensities and energies 7892
  - 27 keV elec. dipole radn., $Pa^{231} \xrightarrow{\alpha} Ac^{227}$, period det. 7893
  - from $Li^7(p, \gamma)Be^8$ intensity 7913
  - yield from K^{40} 8650
  - width of dipole transitions in light elements 8664
  - Ra output intensity 8667
  - from inelastic scattering of 2·7 MeV neutrons 8687
  - **absorption**
    - 5·3 MeV, 10·3 MeV, 17·6 MeV in Cu, Sn, Pb, U 1091
    - photoelec., in atom *L*-shells 1095
    - density meas. concrete slabs appl. 1099
    - thickness control in paper mill 2683
    - penetration, systematic calc. 4321
      - through thin barriers, theory 7107
    - coeffs. for γ-rays, 0·3 to 1·5 MeV 5041
    - in C, measurement and interpret. 5042
    - in earth, comparative data 5043
    - thickness meas., 10 to 100 mm, appl. 5312
    - Co^{60}, transmission through thick U 6216
    - from Ra(B + C), search for anomalies 7097
    - from monochromatic point source, in homog. medium 7101
    - Cu^{63} photon-capture cross-section curve calc. 7929
    - concretes, special shielding 7962
  - **angular distribution**
    - theory 4314
    - from aligned nuclei 415, 5025, 5033, 7100
      - Co 1841, 4288–9, 5653
      - γ-γ ang. correl. 5031
      - information on population distrib. 5034
    - Sr^{88}, mixed E/M transitions 5695
    - statistical model predictions 7029
    - (*d*, *p*) and (*d*, *n*) reactions, polarization effect 7128
    - 12 MeV γ-rays, from *p* on B^{11} 7899
    - polarization, oriented nuclei 5025, 5033, 7100
    - direction-polarization correl., Co^{60}, Cs^{134}, Sb^{124} 1074
      - Co^{60}, Rh^{156}, ThC″ 3563
      - formulae 1085
    - angular correlation, theory 4617
      - Ti^{48} 413
      - meas., geom. correction 416
      - from inelastic scattering 417–18, 7123
      - interference effects 1885
      - from liquid sources 6203
      - external field influence 7092
      - electric quadrupole effect 7111
    - α-γ ang. correl., $F^{19}(p, \alpha\gamma)O^{16}$ 1110
      - radioTh 1878, 5011
      - $N^{15}(p, \alpha\gamma)C^{12}$ 1907, 3576, 7130

- **Gamma-rays**—*contd.*
  - **angular distribution**—*contd.*
    - α-γ ang. correl., AcC to AcC″ 7879
      - $Na^{23}(p, \alpha\gamma)Ne^{20}$ 8675
    - β-γ ang. correl., heavy nuclei 1071
      - Tm^{170} 1884
      - theory 4314
      - As^{76} 7887
      - Sb^{124} 8660
    - γ-γ ang. correl., V^{48} 1869
      - Co^{60}, Cs^{134}, Sb^{124} 1074
      - Fe^{59} 1870
      - Co^{60}, Rh^{106}, Sb^{124}, As^{76}, Ir^{94} 3563
      - theory 4314
      - Au^{198} 5030
      - successive, from orientated nuclei 5031
      - Cd^{111}, elec. quadrupole interaction effect 503 7103
      - Co^{59}, Xe^{131}, Hg^{198} 6213
      - Ni^{60} 7096, 7895, 8666
      - factors affecting resolution 7894
      - Ti^{48} 8668
    - *p*-γ ang. correl., from *d* stripping reactions 111 1121, 2695, 6210
      - Li^6 3594
      - from $C^{12}(p, p'\gamma)$ 2690
  - **detection, measurement** see also *Counter tube Counters; Dosimetry; Gamma-ray spectrometer Radioactivity measurement*
    - scintillation counting techniques 920
    - phosphor-phototube detector 924
    - intensities, "thick" Compton converters method 111
      - with pair spectrometer 5039
      - in atmosphere, rel. to height 5251
      - from $Li^7(p, \gamma)Be^8$ 7913
    - Sc^{46}, β-spectrometer precise meas. 1894
    - chemical dosimetry in presence of neutrons 2025
    - photog. method, film charac. rel. 2643
    - Klein–Nishina differential cross-section rel. to energy 2667
    - polarized γ-radn., by Compton process 2676
    - β-γ emitters in soln., immersion counter efficienc 4154
    - energy calibration of instruments 5036
    - γ-radiosondage app. for mine survey 5230
    - with counter tubes, review 5534
    - detector with low efficiency for fast neutrons 6214
    - photovoltaic detector 6831
    - counter tube appl., anal. 6877
    - scintillation counters (book) 6884
    - scintillation unit 6891
    - automatic isodose recorder 7108
    - photon flux, 150–300 MeV, calorimetric 7109
    - 2·615 MeV standardization, ThC″ 7140
    - around JEEP, BF_3 counters and ionization chamb 7160
    - fluorescent light yield 8340
    - the röntgen, errors in standard 8441
    - sampling airborne Rn products 8648
    - Ra γ-ray output 8667
  - **effects** see also *Nuclear reactions, photons*
    - π^0-meson production 466
    - photo-electrons, etc., *e*-*e* ang. correl. 1094
    - on aqueous benzene solutions 1222
    - cross-linking of polyethylene 2022
    - fog in nuclear emulsions, discrimination 2884–5
    - H_2O_2 formation in H_2SO_4 3689
    - pair production, *Z*-dependence 5046
    - ferric ion reduction in aq. soln. 5760
    - actinometers, calorimetric calibration 7253
    - use in low temperature calorimetry 7634
    - on CdS elect. conductivity 7668
    - "heating" by absorption below 1°K 7897
    - degradation of polymers 8025
    - polymerization of acrylonitrite 8027
    - Fe^{2+} oxidation 8743
  - **internal conversion**
    - 0–0 interactions inside nucleus 420
    - $K/(L + M)$ ratios for *M*4 transitions 425
    - chem. state influence on nuclear isomer lifetime 186 4985
    - Auger effect (book) 1898
    - mesonic origin γ-rays, internal pair production 274

A complete list of the Subject Headings will be found at the end of the Index.

amma-rays—*contd.*
- **internal conversion**—*contd.*
  - magnetic dipole radn., rel. to nucleus dimensions 3566
  - theory of angular correlation 4617
  - coeffs. calc. 4979
  - conversion line energies, β-ray spectrom. det. 5026
  - L-spectra excitation 5501
  - β-ray spectrometer for photog. recording 6844–5
  - in L subshells 7901
  - Auger electron intensities 8669
  - Ag^{106} 6201
  - Ag, Auger transitions 5045
  - As^{71} 7087
  - Au^{198} 4988
  - Au K-series radn., probability 426
  - Ba$^{128-9,\,131}$ 403, 7869
  - Ba^{137m}, continuous γ-radn. 6217
  - Ba^{140} $K/(L + M)$ ratios 4328
  - Bi^{212} K/L ratios 3548
  - Cd^{113} neutron capture 1092
  - Ce^{141} K-coeff. 422
  - Co$^{56-8}$, K/L ratios 1067
  - Co^{60}, $K/(L + M)$ ratio 4323
  - Cs^{128} 7869
  - Cs$^{133,\,135}$ K/L ratios 3548
  - Cs$^{134,\,137}$ $K/(L + M)$ ratios 4328
  - Cu^{67} 7877
  - Dy^{164}, Gd$^{\text{odd}}$, Hg^{199} neutron capture 1092
  - I^{131}, table of coeffs. 1056
  - In$^{110,\,112}$ 4996
  - Ir^{192}, K/L ratio 5684
  - La^{140} $K/(L + M)$ ratio 4328
  - Mg^{24} internal pair conversion 424
  - Mo^{93}, $K/(L + M)$ 4300
  - Mo^{93m}, "core isomerism" 4281
  - Nb^{95} 3552
  - Pa^{231}, conversion electrons study 1093
  - Pd^{109} 7071
  - Pm^{147}, K/L ratio 3548
  - Pt^{193m} 4306
  - Pu$^{239,\,240,\,241}$ 1068
  - Ra (188 keV) 1897
  - RaD 7085, 7872, 7900
  - Re^{187}, K/L ratios 4304
  - Rh$^{104m,\,106}$ 404, 6199
  - Sb^{124} 1083, 4328
  - Sm^{149} neutron capture 1092
  - Sr^{88} 423
  - Te$^{123,\,125}$, K/L ratio 3548
  - ThB, F, I, L and X lines 5036
  - mesoTh2 7090
  - radioTh 1897
  - Tl^{208}, K/L ratio 3548
  - Tm^{170} 7067
  - UX, Auger lines as As β-spectra 5044
  - Xe^{131} soft rad., multipole charac. 7114
  - Zn^{65} 4990
  - Zr^{95} 3552

cattering see also *Compton effect*
- double Compton effect 419
- coherent, by bound electrons 2674
- inelastic, nuclear, by Rh^{103} 5073
- $1{\cdot}3^3$ MeV, by electric field 6215
- from monochromatic point source, in homog. medium 7101
- Hg^{198}, resonant nuclear 7113

as analysis see *Chemical analysis*

as discharge tubes see also *Counter tubes; Ion sources*
- miniature high-stability glow-discharge voltage regulator tubes charac. 874
- spontaneous oscillations 4223–4
- K ion currents of high density 6871
- thyratrons, arc drop and deionization time 6872
- Ne indicator tubes as quantitative photometric detectors 7539
- gas triode, as pulse amplifier 7733
  - a.c. voltages effect on discharge current 8462

ases, kinetic theory see *Kinetic theory, gases*

ases, liquefaction see *Liquefaction, gases*

eiger counters see *Counter tubes*

elatin
- thin films, bonding to solid surfaces 496
- inhibition of gelation by autoclaved gelatin 1226

Gels
- gelatin, inhibition of gelation by autoclaved gelatin 1226
- sol-gel transition, particle swelling 2027
- resonance peak detection 5909

Geochemistry see *Earth, composition*

Geochronology see *Earth, age; Radioactivity, dating*

Geodesy see also *Gravity*
- dynamical, fundamental problem 589
- angular meas. errors elimination 1354
- calc. of deviation of geodesic from normal section 6439

Geometrical optics see *Optics, geometrical*

Geometry see also *Transformations, geometric*
- random packing of spheres 3629
- 2 quantum mech. differential eq., finite approx. of solns. 4550
- the fundamental prime of a finite world 4582
- generalized Riemann spaces, and gen. relativity 8175

Geophysical prospecting
- sound in liquid-filled hole 5338
- instrumentation, review 7341
- **electrical**
  - depth soundings eval. method 5790
  - resistivity depth surveying 7342
  - transient coupling in circuits 7343
  - bridge for conductivity meas. 7663
- **electromagnetic**
  - interpretation of reflection data 3761
    - metallic model experiments 3762
  - r.f. attenuation in shale 3763
  - current-carrying coil near sphere, analysis 4922
  - vertical wire in horizontal slab, field calc. 7344
  - inductance of circuits on two-layer earth 7345
  - magneto-telluric method 8806
- **radioactive**
  - airborne, analysis of conditions 3759
  - simultaneous γ-ray and neutron well logging 3760
  - γ-radiosondage app. for mine survey 5230
  - penetrating radn. surface rocks, meas. 5231
  - airborne scintillation counter equip. 6887
  - scintillation unit for drill-hole logging 6891

Geophysics see also *Earth; Oceanography; Seismology Terrestrial electricity, magnetism*
- instability of fluid sphere heated within 1574
  - and under Coriolis forces 4762
- planetary convection theory applied to earth 5223
- isostatic anomalies calc. 5787
- radioactive meas. in geology 5796–7
- density and compressibility at extreme press.; nature of earth's core 8805

Germanium
- i.r. absorption, new bands in p-type Ge 130
  - in high-purity Ge 144
  - spectrum, thermiated Ge 4007
  - increase due to injected carriers 6780
- mobilities, electrons 221
  - electron and hole, diffusion const. rel. 1636
  - drift, meas. in n-type 3300
  - drift, temp. dependence 4801
  - electron and hole, high fields 6044
  - high-field, with impurity scattering 6045
  - in rectifier and transistor theory 6051
  - pulse drift, rel. to charge carrier ditto 6777
  - current carrier mobility ratio 7670
- low-temp. Hall curve of n-type, Sb-doped Ge 227
- p-n junctions, temp. dependence of current 230
  - high-field current-voltage charac. 534
  - reverse currents, temp. rel. 850
  - pressure-welded, charac. 4097
- opt. and elec. charac. (book) 234
- films, contamination by source matl. 484
  - epitaxial growth on rocksalt 1239
  - evaporation from carbon crucible 5439
  - refract. index, effect of light 8308
- minority carriers, lifetime meas. 844, 849, 858, 4091
  - increased i.r. absorption 6780
- grain boundary barriers 845
- acceptors, thermally induced 847
  - activation energy 223
  - rel. to Cu content 8405–6
  - as lattice vacancies 8409
- props. important in electronic devices 851

A complete list of the Subject Headings will be found at the end of the Index.

Germanium—*contd.*
- rectifiers, neg. resistance freq. characteristic 856
  - elec. forming, thermoelec. study 3310
  - contact p.d. changes 6050*
- photocell, large-area, flying-spot scanner study 862
- conduction props., Hall effect study 985
- single-crystal neutron monochromator 1156
- plastic deformation, single crystals 1190
  - plastic flow analysis 1191
- diamond crystal struct. demarcation 1240
- single crystal preparation 1244*
  - multiple *p*-*n* junction prod. by growth rate var. 229
  - with high lattice perfection and both *n* and *p* regions 858
  - purification and segregation prevention 2809
  - vacuum furnace for single crystal pulling 8768
- surface props., elec. and photoelec. 1637
- crystal, electronic structure 2057, 3475
  - Brillouin zones, cyclotron resonances and magnetoresist. data 4805
- point-contact rectifiers, high inverse voltage, reverse charac. 2455
  - current/voltage charac., theory 3308
  - some thermal props. 7673
  - transit time effect on behaviour 8421
- thermal exp. and elasticity, −195° to 275°c 3235
- liquid, vapour pressure, reaction with Pt 3238
  - surface tension 7490
- thermo- and galvano-magnetic coeffs. 3304
- superconducting compounds 3316
- thermally treated, elec. props. 3309
- Hall effect modulators and "gyrators" 3470
- electrons collision freq., microwave det. 4077
- impurities, solubility and ionizability 4090
- phototransistors, 3 types, properties 4096
- filaments, shot noise 4099
- In distrib. coeff. on crystallization 4407
- solubility in Ga and In 4646
- u.s. attenuation defects study 4666
- temporary traps in *n*-type Ge 4803
- photo-magneto-electric effect 4812
- molec. evap., ion cluster formation 5524
- dislocation of lineage boundaries 5774
- radiative transitions due to electron-hole recomb. 6040
- thermal disordering process 6041
- space-charge limited hole current 6047
- isotopic constitution by mass spectrometry 7059
  - from tetramethyl mass spectra 3393
- Li diffusion into 7196
- Sb and Ga solutes, distrib. in Ge crystals 7279
- $C_p - C_v$ 7641
- *p*-type, *n*-type surface conductivity 7669
- low-temp. elastic consts., u.s. det. 7989
- O-induced surface acceptor levels 8407
- elec. resist. modulation by h.f. acoust. waves 8408
- as semiconductor circuit element, review 8413

Germanium fluoride
- GeF_4, calc. thermodynam. props. 197

Glaciers
- flow measurements, law deduction 8808

Glass see also *Optical materials; Vitreous state*
- in vacuum technique (book) 77
- optical, damage by evap. films 173
  - coloration by high-energy radn. 2638
  - photoelast. const. det. 3192–3
  - 980 : 222, characteristics 5940
- small spheres, production and separation 479
- silicate, diel. const. and loss angle rel. to comp. 834
- elec. conductivity, B–Tl glasses 857
  - alkaline boro-silicate 1639
  - B_2O_3–Na_2O, B_2O_3–K_2O 4085
  - surface, when damp 6034
  - d.c. meas. 7664
- flow at room temps. 1166
- thin layers as supports, electron microscopy 1184
- physical properties (book) 1321
- surface polish, interferometric study 1559
  - phase-contrast study 3216
- rupture, influence of temperature 1987*
  - influence of humidity 8000
- viscosity meas., review 2226
- light transmission, effect of irradiation 2637

Glass—*contd.*
- elastic moduli and internal friction, temp. rel. 27
- non-hygroscopic, pH response 2787
- porous rod, length changes with adsorption 2794
- luminescence due to α-particle irradiation 3174
- high polymer, heat of solution 3274
- max. vel. of crack propagation 3662
- H, O, A and He, solubility in Pyrex at 1170°c 39
- containing Ti and heavy metals, u.v. absorption 40
- equilibrium, irreversible approach 4401
- effects of v. high pressures 4435
- i.r. absorption, high temp., modulated-beam me 4719
- cylind. rods, dynamics of fractures 5144
- no surface flow in polishing 7194
- i.r. reflection spectra, lead glasses 7604
- surface devitrification temp., adsorbed gases eff 7966
- extent of cracking rel. to resistance 7999
- internal friction, theory 8003
- surface transition layers, rel. to alk. content 8154
- thermodynam. and kinetic props., review 8710
- cut under liquids, strain release rel. to free interfa energy 8714

Glass-metal seals
- in vacuum technique (book) 77
- h.f. heating method appl. 4540

Glycerine
- dielec. and u.s. relaxation, rel. 1456
- refractive index discontinuity at change of state 6
- dielectric relaxation 6754

Gold
- radiation damage and recovery 216
- films, bonding to solid surfaces 496
  - evap., opt. const. det. 158
  - u.v. optical constants 2318
  - metal surface replica appl. 2760
  - radn. induced by α-particles 4449
  - thick, reflectivity and optical const. 4737
  - elec. conductivity phenomena 4797
  - granular structure 7971
- pure, quenching-in of lattice vacancies 536
- fast electrons in, energy loss and straggling 902
- anomalous skin effect invest. 2458
- resistivity, change on deformation 3657
  - very low temp. 4105
  - wire, cold working effect 4109
- foil, proton energy loss 4873
- surface tension at m.pt. 5323
- thermionic constant 6905
- thermal cond., low temp., mag. field 6698
  - 2–150°K 6700
- electropolishing 8017

Gramophones see *Sound reproduction*

Granular structure
- lattice vacancies and porosity, Cu–Ni alloys 1168
- grain size influence on coercivity 1757
- polygonization during diffusion 1964
- dense random packing of unequal spheres 3629
- dislocation model of grain boundary 5774
- isothermal growth in alloys, theory 6245
- polycrystal yield point, crystall. struct. effect 627
- thin films, Au, Pd and Au–Pd 7971
- domain pattern in Si–Fe under stress 8604
- boundary, transition struct., in bubble raft 8711
- boundary behaviour under shear stress, bubble 8712
- Al, grain boundary movement 8725

Graphite
- electronic band structure 344
- π-electrons momentum distrib. 345
- artificial, elec. resistivity 842
- lattice vibrations 991
- Compton radiation spectrum 1090
- slow neutron scattering, energy distrib. 1154
- self-diffusion mechanism 1169
- self-diffusion, C^{14} tracer study 1170
- spiral growth 1241
- in cast iron, crystal distortion 2050
- low temp. thermal conductivity 2400
- thermal and elec. conductivity, thermoelec. po 2463
- thermionic const. det. 2516

aphite—*contd.*
  polycrystall., anisotropic susceptibility 2533
  interstitial compds., elec. resistivity 3302
  synthetic, density, rel. to closed pores 3633
  spec. heat, very low temp., statist. expression 3716
  single cryst., elec. conductivity 4086
  natural and artificial, polycrystall., elec. props. 4087
  U-graphite reactor lattices 4374
  thermal neutrons diffusion length 5119
  neutron-irradiated, adsorption 5181
  spectral emissivity 5370
  artificial, thermal conductivity of rods 5996
  resist. therm. for very low temp. 7639
  Br effect on diamag. susceptibility, theory 8513
aphs see also *Nomograms*
  methods for "best" straight line 7380
  for thermionic emission work function calc. 7747
avitation see also *Relativity*
  eq. of fit for spherical distrib. 18
  field of point mass in arbitrary motion 594
  Birkhoff's theory, eq. of motion 595
  instability of turbulent medium 1336
  modified Newtonian systems 1365
  arbitrary matter conc. and Schwarzschild singularity 2168
  quasi-relativistic theory 2174
  Mach's principle 2924
  field of charged point-mass 2940
  field eq. in continuous creation theory 3797
  thin atmos. equilib. round central core 3827
  spherically symmetrical, boundary conditions 3849
  rel. to cosmological field 4558
  extended theory, invalidity of Birkhoff's theorem 4583
  gravitational waves theory, auxiliary conditions 4584
  and cosmic expansion in conformal space-time 4586
  the Lorentz transformation 4587
  gravitational waves and motion of gases 5287
  gen. relativistic theory, field eq. deriv. 5846
  and electromagnetism, 5-dimensional theory 6446
  conformal relativity 7414
  gravitational motion, review 7421
  5-dimensional quantum theory 7424
  in cosmology, review 8183
  unified field theory 8209
    Einstein's theory modification 1359
    relativity similarity theory 2170
    and Born–Infeld electrodynam. 2932
    6-dimensional space 6447–8
avity
  absolute det. by timing falling rule 12
  measurement in boreholes 13
  free fall method, gas viscosity rôle 1355
  isostatic model with 2-layer crust 2089
  meas. at sea, 2nd-order correction terms 2161
  isostatic anomalies calc. 5787
oup theory
  in *S*-matrix theory 53
  linear molec. vibr. spectra appl. 354
  appl. to boundary-value problems 2144
romagnetic effect
  in Permalloy and Fe 329
  electron anomalous mag. moment 387
  proton ratio, in terms of K 388
  ratios sign determination, microwave spectra 729
  Supermalloy 2552
  microcrystall. and macrocrystall. matls., ratios 4917
  rotation-by-magnetization method for ratio meas. 8577
  microwave Faraday effect appl. to "microwave gyrator" 8598
fnium
  superconducting props. below 1°K 864
  isotopic constitution 7059
ll effect
  conduction phenomena 2-layer model 213
  sensitive recording apparatus, a.c. 340
  semiconductors, appl. in study 985
    adiabatic 4808
    current carriers conc. distrib. 6038
    isothermal, theory 6978
    diffusion currents 7671
  metals with pos. coeffs., electron-inertia expt. 986–7

Hall effect—*contd.*
  polycrystall. graphites 4087
  ferromagnetics, two effects 5599
    theory 8599
  as indicator of structure of steel 5601
  in molybdenite 6768
  Hall coeff. for ionized layer, crossed fields 6974
  Al and Be, low temp. 4938
  Bi, rel. to resist. increase, low temp. 4815
  Bi–Pb alloys 6807
  Ca Hall coeff. 4235
  CdSb, coefficient 3306
  Co, Co–Ni and Armco iron 6977
  Cu_2O, below room temp. 8403
  Cu_2O_3–Al_2O_3 Hall coefficient 8412
  CuNi alloys 1794
  Fe, electrolytic, temp. dependence 5600
  Ge, electron mobility meas. 221
    heat-treated crystals 223
    degenerate sample, low-temp. Hall curve 227
    thermally treated 3309
    crystals, application of 3470
    single crystals, impurities effect 4090
  InSb single crystals 8410
  NaCl, electronic 8600
  in Ni ferrite 988
  PbS, sintered 226
  PbS, PbSe, PTe data, forbidden gap calc. 3299
  in Si containing Al 841
  in Ti 3469
  TiO_2 semiconductors, ceramic and single crystal 8414
  in Zn crystals, low temps. 1793
Hardness see also *Abrasion; Work hardening*
  BaF_2, CaF_2, compared 489
  of metals (book) 1198
  crystals, anisotropy 1199
  annealed steel, static and dynamic 1990
  micro-hardness anomalies, theory 7223
  Ni, changes during energy release 8722
Harmonic analysis see *Acoustic analysis; Calculating apparatus; Fourier analysis*
Hearing see *also Ear*
  complex-freq. analysis, phase-principle 712
  information of elem. auditory displays 1312, 6341
  pitch discrimination 1313
  damage risk for steady-state noise 1314
  hearing loss in industry 1316
  single channel sound transmission problems 2116, 5824, 8149
  obstacle perception, sound sources for 2282
  auditory tests with synthetic vowels 2300
  electrophonic, effect of different electrodes 4533
  phenomena, telephone observation unreliable 5261
  physiol. and psychophysiol. basis of musical taste 5262
  "supraliminaire," explanation 5825
  math. theories of cochlear dynamics, review 6342
  acoustic attenuation between ears 6343
  cochlear adaptation patterns, 3 freq. regions 6344
  shearing microphonics by vibrations near hair cells 6346
Heat see also *Radiation, heat; Thermodynamics*
  thermal potl., generalization 792
  heat eq., elementary soln. 2895
  pseudo-adiabatic transformations of open gaseous systems 6693
  sonic and thermal energies equivalence 7529
Heat capacity see also *Specific heat; Thermodynamic properties*
  diacetylene 196
  GeF_4 197
  superconducting metals, theor. and experimental 198
  at T_c, anomalous, rel. to 2nd-order trans. 2407
  Sr and Ba titanates 3267
  Mg titanates 3268
  gallium 3272
  methane adsorbed on rutile, 80°–140°K 6737
  gases in equilib. or reacting, isotopic substitution effect 8004
Heat conduction see also *Conductivity, thermal; Heat transfer*
  lattice vibr. spectrum influence on electronic conductivity 1571

Heat conduction—*contd.*
- heat flow eq. solutions, stability 1572
- Hg cathodes, temp. gradients in cooling air 1660
- liquid transport processes, theory 2239
- Kroll method convergence 2401
- boundary layer in liq. He II 2413
- surface defect effect, heat-producing solid 4052
- in presence of temp. grad. and chem. reactions 4645
- radial-axial flow, cylindrically bounded regions 4755
- differential eq., Picone procedure appl. 5433
- in cylinder traversed by current 5434
- in semi-infinite solid, integral tabulation 5993
- fluids, diffusion theory 6532
- in internally heated sphere 6694
- solid, with periodic boundary conditions, moon appl. 6695
- in a homogeneous bar 6697
- convection/conduction loss, hot wire 6702
- interferometrical study 7620
- in single metal cryst. from melt 7284
- in mag. field, review 7675
- statist. theory of linear dissipative systems 8243
- role of radiation in conduction process 8354
- solid bounded by parallel planes, Hankel transforms appl. 8355

Heat losses
- convective, dependence on air velocity 3234
- convection, from moving wall 7622

Heat measurement see *Calorimetry*

Heat of adsorption
- partial thermal accommod. coeff. det. 6018

Heat of crystallization
- heat produced by strain on rubber 5139

Heat of dissociation
- diatomic interhalogens 201

Heat of formation
- crystal energetic relationships in oxysalts 497
- liquid ammonia 824
- ethyl halides 4439

Heat of fusion
- Teflon tetrafluoroethylene resin 818
- transformation pressure effect 1577
- gallium 3272
- UF_6 4634

Heat of reaction
- heats of activation, calc. from ground-state energy and ionization potl. 998
  - Ag–Zn solid solns. 1160
- transport phenomena 4645
- phys. chem. textbook 5148
- CO and Cs 8005
- fluorocarbon and hydrocarbon solutions, energies of mixing 8006

Heat of solution
- glasses, high polymer 3274
- Si and Ge in Ga and In 4646
- acetone/*n*-hexane mixtures 6017
- rel. to phase changes in polystyrenes 6304

Heat of sublimation
- BaS 294
- germanium 3238
- UF_6 4634
- C_3 7644

Heat of transformation
- differential thermal analysis meas. 195

Heat of vaporization
- He 1586
- C, invest. 3275
- UF_6 4634
- H_2O, calc. 8359

Heat of wetting
- in adhesion 8727

Heat radiation see *Radiation, heat*

Heat transfer see also *Convection; Heat conduction; Radiation, heat*
- distrib. round cylinders in crossflow 177
- surface exchange mechanism, fluidization effect 178
- in film boiling process 793
- in reacting fluid mixtures, theory 794
- book notice 797
- He II, pulses below 1°K 804
  - exchange with solid body 806
  - through fine slit 7637

Heat transfer—*contd.*
- heat flow eq. solutions, stability 1572
- heat exchanger regulator, fusion of roots study 1
- problem solution with models 2403
- in laminary flow between parallel plates 2404
- interchanger for large liquefiers 2423
- to a boiling liquid 3232
- porous heat sources, numerical method 3233
- in pile with liq. reactant, turbulence effect 4375
- basic methods (book) 4653
- convection and evaporation processes 4761
- Fourier's hypothesis and Onsager's rel. 5435
- in liquids, under electric fields 5998
- in parallel oil layers 6703
- mathematics of column processes 7228–9
- convection and conduction systems, interf metrical study 7620
- nuclear fission reactor coolants 7947
- analogy, I^{131} vapour in airstream 8269

Heat treatment
- quenching-in of lattice vacancies in pure Au 536
- Al, lattice deformation 2076
  - pure, effect on creep props. 4427
- dislocation theory, review 3648
  - Ni film, evidence for dislocation ring format 3724
- effect on Ni sheet mag. props. 4216
- influence on Ni–Mn alloy Young's mod. and den 4399
- quenched cylinders and spheres, photoelast. stu 4424
- bombardment damage annealing 6272
  - in Cu 5608
- Fe alloys, X-ray interference invest. 6273
- elec. resist., α-brass, effect of annealing 7667
- recovery in artificially aged alloys 7997

Heating
- solar furnace, centrifugal 184
  - Montlouis, semi-industrial 802, 1582
  - in dilatometric studies 6707
- in heat-producing solid, behind surface defect 7 4052
- ferromag. semiconductors, fusion method 799
- h.f. furnace tech. for alloy fusion 1322
- porous sources, numerical method appl. 3233
- r.f. dielectric, herbage laboratory drying appl. 37
- due to shock waves, producing luminosity 3946
- cylinder traversed by heavy current 5434
- due to plastic deformation 5737
- subterranean waters above critical press., appl. 5
- by acoustic waves, energy equivalence 7529
- variable temp. and humidity oven 8753
- vacuum furnace for Ge single crystal pulling 876
- differential thermobalance 8249

Height measurement see *Altimeters*

Helium see also *Liquid helium*
- solid-liquid critical point 183
- containing A, Kr and CO_2, α-particle ionization
- translational dispersion, theoret. and expt. 677
- energy per ion pair 933, 4885
- in meteorites, cosmic-ray contrib. 1340, 4182, 851
- diffusion in zircons, mech. 1426
- latent heat and vap. density 1586
- h.f. discharges, collisional processes and similar 1655
- Verdet const. det. 1792
- "compressed atom model" 2255
  - polarizability 2256
- 2nd virial coeff. near abs. zero 2258
- ionization by electrons, Townsend coeff. calc. 339
- refract. index at 9200 Mc/s 3455
- He II problem in nebula radn. press. 3820–1
- solubility in Pyrex at 1170°C 3925
- metastable state, lifetime 4290
- He^3 reactions in nuclear emulsions 4342
- beam in H, He, air and A, charge states 4390
- ionization function for fast electrons 4861
- proton energy losses 4874
- high current arc characteristics 5489
- triplet splitting of $2p^2$ state 5661
- specific primary ioniz., 0·2–1·6 MeV electrons 61
- He_2^+ ions, mobility in He 6119
- repulsive potl. nonadditivity 6162

Ielium—*contd.*
viscosity of binary gas mixtures, He–A, N_2, CO_2 6536
solid, thermodynamics, melting 6725
stopping power for H, He, N, Ne ions 6868
He I ground state correl. energy 7050
unstable levels population eval., stellar and nebula atoms 7403
solid, thermal conductivity 7632
mag. moment of atom, metastable triple state 7846–7
as coolant for nuclear reactors 7947
and A, mixtures, viscosity meas. 8273
ions, charge exchange in metals 8477
  range-energy rel. in gases 6099, 6868
Iematite
growth and etch phenomena 532
Iigh-pressure effects
influence on thermistor resistivity 812
on quartz piezoelectric resonance 835
on elec. resistance, up to 100,000 kg/cm^2 837
metals, multiple scabbing by explosive attack 1163
explosive-driven metal, photog. surface study 2749
Ni saturation magnetization increase 4237
10^4 to 10^5 atm., on glasses 4435
A, specific heats ratio 4773
luminescence of argon 5406
conductivity of gases 5471
tensile properties of metals 5740
production by adiabatic compression 5741
on diffusion, in CCl_4–SnI_4 7495
  in liq. S 7497
on melting point of metals 8358
in earth's interior 8720, 8805
Iigh-speed photography see *Cinematography, high-speed; Photography, high-speed*
Iumidity see also *Atmosphere, humidity; Hygrometers; Moisture*
accurate control method 3018
meas. by anodized Al elec. effect 3285
measurement, brief guide 5328
influence on glass rupture 8000
effect on AgI nucleating properties 8128
variable humidity oven 8753
Iydrazine
production in glow discharges 6823
Iydrodynamics see also *Flow, liquids; Jets; Liquid oscillations; Liquid waves; Viscosity*
of oscillating cylinder viscosimeter 60
book notice 640
periodic fluid flow, circular tubes, acoustic analogy 673
temporal evolution of rotating mass of gas 1351
fluid sphere heated within, instability 1574
in physics teaching 2229
magneto-hydrodynamic waves, propagation 2561
  compressible medium, turbulence 2992
  shock waves 3799
  oscillations of star 3829
  generalized formulae 4919
  longitudinal, properties 5339
non-Newtonian fluids 2989
of He II 3256
plasma particle motion under applied field 3324
spherical shells, thermal instability convection 4053, 8356
fluid motion in pipes under mag. field 4220
systems with arbitrary no. of integrals 4623
max. velocity in Gromeka–Beltram's motion 4635
Dirac function appl. to elementary problem 4636
actual trajectories of fluid particles 4637
Navier eq. solutions, props. 5320
of pure liq. He II, and solutions in He II 5443
slow motions in a rotating fluid 5878
Lagrange's theorem, new proof 5880
Couette flow, plane, stability 5882
  Meissner's entropy principle 5883
integral repres. of field vector 6456
non-viscous fluids and He II 6721, 8375
quantum, and theory of liq. He 6726
solid bodies in liquids
missiles, vertical entry into water 647
spherical bodies squirming motion 649
moment of submerged solid of revolution 650

Hydrodynamics—*contd.*
solid bodies in liquids—*contd.*
infinite plate impulsive motion 651
elastic spheres susp., Brownian deformation 652
sphere moving parallel to plane boundary 2996
vanes "singing" in water 3031
vibrations of elastic shells in fluids 3034
microscopic organisms, self-propulsion 3910
rotating spheroid in slow stream, couple 4640
Coriolis force on sphere 6517
particle size in suspensions, theories of measurement 8628–9
Hydrogen
Maxwell reflection coeff. det. 81
halogen–H compounds, polarization energy calc. 351
HD nuclear resonance, spin-spin interaction 356
H_2 susceptibility 369
atomic, conc. at a cathode calc. 510
  electrodes, and H overvoltage 511
h.f. discharge in mag. field, resonance 872
electrons and α-particles, energy per ion pair 933
H_2^+, 2nd-order perturbation energy calc. 994
  united atom calc. 5626
  polarizability 7019
  ground state quadrupole transitions 8619
neutral H_2, electron affinity spectrum 1710
bonds, conditions for formation 2035
partially converted, liquefaction and storage 2422
arcs, temp. meas. 2471
slow electrons diffusion in 2508
transmission through H by electrolysis 2752
dissociation on W filaments 2779
refract. index at 9200 Mc/s 3455
from flames, septum permeation 3635
relationships with metals 3636
intense drying with K 3705
2nd state atoms in solar chromosphere 3811
solubility, in Pyrex at 1170°c 3925
  in liq. metals 7502
shock front shape and thickness 3945
ortho- and para-, low temp. viscosity difference 4633
liq., compressibility, molec. radius, association, from sound velocity 4664
excited, ionization by electrons, calc. 4887
nature of H bridge, diborane 5183
jets sensitive to u.s. vibrations 5327
$1s$–$2s$ excitation cross-section calc. 5664
H liquefier 6011
specific primary ioniz., 0·2–1·6 MeV electrons 6116
forces between H_2 molecules 6160, 6982
treated as 2-particle system in interaction 6462
viscosity of binary gas mixtures, H_2–A, N_2, CO_2 6536
H–F flame temps. 6717
spark channels, properties 6818
canal rays, strongly luminous 6853
stopping power for H, He, N, Ne ions 6868
charge on combining atoms 7257
low conc. in N, meas. 7266
solid, nuclear magnetic resonance 7796
H–N mixture, thermal diffusion 8270
Hydrogen chloride
cohesion theory of liq. struct. 1424
activity data and assoc. in conc. soln. 4647
bond lengths and constants 6638
Hydrogen fluoride
bond energy, etc., quantum calc. 6994–5
Hydrogen peroxide
magnetic susceptibility, structure 522
formation by Co·γ-rays 3689
formation at fresh metal surfaces 3690
ionization, dissociation by electrons 4886
formed by proton irrad. of water 8742
Hydrogen sulphide
cohesion theory of liq. struct. 1424
thermodynamic properties 3276
photochem. and thermal decompositions 4447
thermal conductivity, 0–50°c 4760
Hydrometry see *Flowmeters*
Hydrostatics
rel. to fluid dynamics (book) 640
Hydroxylamine
thermodyn. props., molecular struct. 2592

A complete list of the Subject Headings will be found at the end of the Index.

Hygiene see also *Radiation monitoring; Radiation protection*
u.v. radiation effects (book) 2394
handling of radioactive and toxic substances 4333
Hygrometers
short description and use 5328
Hysteresis see also *Magnetic hysteresis*
in optical slit mechanism 114
field-polarization, ceramic $BaTiO_3$ 1613–14
in rubber 1986
visco-elastic 3899
Ice see also *Glaciers; Snow*
and tritiated ice, luminescence 146
spiral form crystals grown from vapour 531
crystals in sky, reflection and diffraction 568, 5811
particles, effect on radar rain location 1287
T_2O crystal, luminescence behaviour 1542
water film as liquid ice 1607
particles, microwave attenuation and scatt. 2571
thermoluminescence 3175
anisotropy of dielectric const. 4789
temp. of co-existence with salt soln. drops, atm. 5243
piezoelectricity invest. 5465
microwave scatt. by melting ice particle 5809
dielectric constant calc. 6030
friction coeff. rel. to temp. 6278
structure and residual entropy 7014
friction of runners on 7226
nucleus formation in frost-supersat. region 7356
flow law, from glacier measurements 8808
Illumination see also *Brightness*
Luckiesh–Moss visibility meter appl. 101
colour adaptation study 786
method for bronze paints colorimetry 1564
effect on pseudo-isochromatic plate colour vision tests 2108
Macbeth illuminometer, colour matching filters 2307
quantity spec., brightness discrimination 2864
by extended sources, photic field theory 3082
fluorescent lamps, colour-rendering props. 5430
quantities and units 6588
photomultiplier cell meas. 6593
effect of lens between source and surface 7538
of colour transparencies 8174
Impact see also *Ballistics*
multiple scabbing of metals by explosives 1163
jet formation, limiting conditions 2994
energy absorption by pulverization 3892
transient stress wave particle velocities, engravement 4431
Indeterminacy
information in quantum measurements 57
in relativity theory 596
Heisenberg's relation as stochastic dependence 635, 5867
Einstein's paradox in quantum mech. 5305
effect on Maxwell's demon.? 5308
Indium
evap. films, optical const. det. 158
vapour, in disch. lamp 176
atomic *g*-values, perturbations 386
superconducting, thermal resist. rel. to field strength 865
new chemical etchant 2053
compounds with P, As, Sb, semicond. props. 3298
resist. rel. to mag. field, low temps. 3319
atomic heat, 12° to 273°K 6014
thermal cond., low temp., mag. field 6698
film, superconducting props. 7684
heat conductivity below 1°K 7688
Inflammability see *Combustion*
Infra-red spectra see *Spectra*
Instruments see also *Laboratory apparatus; Measurement; Recording;* and under specific subjects, e.g. *Astronomical instruments*
logarithmic counting-rate recorder 16
apparatus for transformation of photometric to blackening curves 102
with inkless recording 593
Brownian motion of electrometers 6441–2
for geophysical prospecting, review 7341
Insulin
molecular structure 1819
Integral equations
neutron diffusion, variational method for appro soln. 477
numerical and graphical integration of oscillation e 1328
for perturbation eq. 1329
graphical method for Schrödinger eq. integration 133
Schwarzschild's, conditions for general soln. 1349
generalization of symmetrical kernel 4555
Integrals see also *Calculus; Fourier integrals*
variant integral assoc. with wave eq. 2
exchange integral calc. 2892
divergent, summation, Dirac function appl. 4551
operation, wave mech. extension appl. 4622
heat conduction in solid, tabluation 5993
2-centre, estimation 8615
Intensity measurement
 acoustics
  Rayleigh disk, upper freq. limit 698
   moment, high-frequency 701
   genuine anomalous action 702
  complex waves, mean power meas. 695
  portable u.s. outputmeter, and calibration 699
  formula for pressure on circular disk 700
  noise research problems 714
  ultrasound, by temp. effect in water 1468
  ultrasonic, in water 2290
  ventilation system noise 3069–70
  experimental probe microphone 3959
  automobile horns 4670
  by forces exerted in viscous medium 5352
Interface tension see *Surface tension*
Interference
convergent electron beams, extinction lines crossin 3354
superposition of 2 coherent electron beams 3355
 acoustic waves
  interference filters 694
  waves reflected from plane surface 3061
  ultrasonic, made visible by phosphors 8333
 light see also *Optical films*
  textbook 98
  photons with non-vanishing rest mass near m perfect reflector 99
  wedge use for spectrum projection 108
  filters, survey of types and appl. 160, 765
   S-matrix poles 6671
   for photometry and colorimetry 8327
  secondary, in u.s. waves light diffract., made visibl 163
  by double refraction, white light, transparent object observation appl. 780
  ray reversibility in stratified media 2357
  white light, demonstration device 2382
  Fabry–Pérot system charac. direct meas. 3178
  refract. index and thickness det., plane parallel plate 4691
  Al films, phase changes 4718
  interference systems with given spectro-properties 473
  Fresnel's two-mirror expt. 4740
  angle-mirror, and aperture chamber 4741
  photoelastic studies, plastics appl. 4747
  light-pattern calibration of disk recordings 5368
  TiO_2 films as near i.r. selective reflectors 5977
  interference microscope using spar cut ⊥ to axis 6686
Interference fringes
angle subtended by distant object, meas. 162
interpretation by observers in relative motion 1476
precision meas. of lens distortion 3088
birefringent crystals, transmission-like reflectio fringes 3191
by superposition of coherent electron beams 3355
fiduciary, in Jamin refractometer 3971
multiple-beam Fizeau, intensity distrib. 4040
Fresnel's two-mirror expt. 4740
formed by aperture chamber (Lochkammer) 4741
white-light, Mach–Zehnder interferometer adjustment for 5979
reversible counting methods 5980
sharpness, semi-silvered Fabry–Pérot, wavelength influence 6669
electronic location method 7606
white light, of equal thickness, by scattering 7612

- **nterferometers**
  - electron beam interferometer 5515
  - **acoustic waves**
    - beat wave-length type 1450
    - frequency-modulation type 1451
    - substitution type 1452
    - 11 Mc/s, for l.p. gases 2294
    - u.s., fixed path, for gas absorption meas. 2297
  - **electromagnetic waves**
    - parallel pair of wire gratings 1560*
    - Fabry–Pérot type for mm wavelengths 6969
  - **light**
    - Mach–Zehnder, generalized vector theory 2383
      - adjustment for white-light fringes 5979
    - Fabry–Pérot, transmission factor meas. 3178
      - etalon resolving power 7608
      - optimal spacers selection 7609
    - for investigation of compressible flow 3180
    - Lummer–Gehrcke plate, intensity effects 4041
    - practical text-book 4042
    - surface micro-interferometer 5982
    - theory of multiple etalon 7607
    - N.P.L., gauge, spectrographic unit for 8344
- **nterferometry**
  - **acoustic waves**
    - u.s., in methyl chloride 1455
    - detection of u.s. waves 2289
    - ultrasonic detection app. 2289
    - u.s., of amino acid aq. solns., and isomers, compressibilities 6534
    - ultrasonic, in gaseous SO$_2$ 7527
    - ultrasonic absorption in NH$_3$ gas 8290
  - **electromagnetic waves**
    - radio stars, ang. dia. meas. 2147
    - ionospheric echo phase change meas. 7347
  - **light**
    - high resolving power echelle spectrograph 109
    - meas. method for sedimentation, electrophoresis and diffusion 159
    - silvered films and dielec. multiple films compared 161
    - angle subtended by distant object, lab. meas. 162
    - evap. technique effects on optical glass, invest. 173
    - 3-beam, microscopic objects thickness meas. 779
    - quartz crystals, exam. of faces 1238
    - small refr. index diff. meas. 1487
    - Köster double prism, thin film meas. 1558
    - multiple-beam, surface polish study appl. 1559
      - etch pits study 2055
      - metal surface fine struct. exam. 3215
    - diamond abrasion hardness props. invest. 1995
    - end-gauge and slip-gauge comparison 2220
    - polished diamond surfaces, exam. 2384
    - astronomical, atm. dispersion significance 2905
    - chromospheric line width meas. in eclipse 2913
    - of length, development 2971
    - planeness and bending of optical flats 2973
    - straightness of microscope stage, meas. 2974
    - calibration of angle standards 2976
    - thin films, simultaneous thickness and opt. const. det. 3177
    - accurate fringe shift meas. 3179
    - gas flow meas., improved technique 3179
    - electromech. pick-up calibration 3939
    - interferometer microscope, for opaque objects 4047
      - optical thickness meas. 4742
      - for large reflecting objects 8351
    - stearic acid crystal growth and birefringence 4469, 7283
    - textile fibres, conf. rep. 5127
    - modulation method, appl. 5417
    - vibration fringe system analysis 5418
    - wavelength or length meas. by reversible fringe counting 5980
    - grating blank film thickness meas. 5981
    - polarization interferometer liq. diffusion invest. 6531
    - optical thickness meas., three slit method 6670
    - corrosion figure observation, topaz and carborundum 7286
    - heat flow convection, conduction, appl. 7620
    - Lummer-plate photometry of Fraunhofer *D* lines 8193
    - spectrographic unit for N.P.L. gauge interferometer 8344
- **Internal conversion** see *Gamma-rays, internal conversion*
- **Internal friction** see *Elastic losses*
- **Internal stresses** see *Stresses, internal*
- **Interstellar matter**
  - absorption variation with wavelength in 3 regions 7
  - ion recombination theory appl. 293
  - line emission in r.f. range 581
  - fluctuating density field model 2159
  - Mie diffraction theory appl. 2387
  - luminous intergalactic matter 2907
  - magnetic fields origin, moving plasma theory 3324
  - astrophysics symposium (book) 3795
  - gas clouds, structure 3798
    - study of motion 8184
  - clouds, magneto-hydrodynamic shock waves 3799
  - prop. of interstellar gas related to cosmic rays 6386
  - occurrence of elect. discharges in gas 7386
  - source of kinetic energy 7387
  - continuous absorpt. coeff. rel. to wavelength 7388–9
  - rel. to fluctuations in Orion variable stars 8194
  - isothermal gas, rate of accretion by star 8198
- **Iodine**
  - low abundance in meteorites 10
  - opt. and elec. charac. (book) 234
  - activated by neutron capture, reactions with CH$_4$ 515
  - atoms recombination 5613–14
    - in rare gases 3482
  - photoelectric constants 6797
  - chemical behaviour at low conc. 7232
  - prod. from KI by hard X-rays 8741
- **Iodine bromide**
  - thermodynamic functions 201
- **Iodine chloride**
  - thermodynamic functions 201
  - dipole moment calc. 5647
- **Iodine fluoride**
  - thermodynamic functions 201
- **Ion beams** see also *Mass spectrometers; Particle accelerators; Range of particles*
  - conversion to short, intense, monoenergetic pulses 269
  - crooked trajectories in mag. field with symmetry plane 891
  - e.m. wave propag. in electron-ion streams 1772
  - neg., noise in 2509
  - ion optics in accelerator tubes 3362
  - in mass spectrometry (book) 4152
  - projection into atm., dynamic press stage elements 4830
  - mono-energetic, obtained by mag. field 4843
  - electrostatic energy analyser 5525
  - strongly luminous H canal rays 6853
  - from accelerator, monochromatization technique 6854
  - high density K ion current in diode 6871
  - energy spectrum of canal ray ions 8436
  - nuclear reactions due to fast N ions 8673
  - **focusing** see also *Alpha ray spectrometers; Electron lenses; Electron optics; Ion microscopes*
    - combination of 1/r mag. and cylind. elect. fields 4867
    - double-dir. and velocity focusing mass spectrom. 4868
    - 2nd-order, wedge mag. field 4869
    - angular aberration correction 5526
    - electromag. isotope separator 5527
    - amplitude variation of accelerating field 7728
    - double focusing, 2 magnets, nonuniform fields 8443
    - special contact transformations 8458
- **Ion counters** see *Counters*
- **Ion microscopes**
  - secondary emission due to Li^{++} on metals 914
- **Ion sources** see also *Thermionic emission*
  - high-intensity, pulsed 269, 8463
  - an r.f. ion source 915
  - new extraction principle, appl. 1694
  - low-energy neg. H and O ions, 5 types 2509
  - pulsed, synchronization links 3363
  - for mass spectrometry (book) 4152
    - Nier-type 4863
    - for suppression of mass 19 ions in water mass spectra 5189
    - surface, multiple filament 6866
    - for solid material 8465

A complete list of the Subject Headings will be found at the end of the Index.

Ion sources—*contd.*
- new general method of extraction 5532–3
- solid, prep. in induction and solar furnaces 5547
- Phillips ionization gauge type 6104
- 27 Mc/s, inductively coupled, design and test 8464
- magnetic, for portable 250 kV accelerator 6859

Ion velocity
- drift velocities, in Kr and Xe 292
  - in O, N, CO 2514
- ions in room, from neg. corona discharge 2513
- He_2^+ ions, mobility in He 6119
- **electrolytic** see also *Conductivity, electrolytic; Electrophoresis*
  - Cs^{137+} in NaCl single crystals 5160
  - through metallic coatings, concentration effect 5754
  - abnormal mobilities due to macroscopic charge formation 7245, 8012
  - migration due to potl. gradient, Lindemann, Darmois–Sutra theory 7246

Ionium
- determination in deep-sea sediments 5795

Ionization see also *Dissociation; Electrons, ionization*
- variational method for radiationless transitions 25
- density, brush discharge in dielectrics 877
- ionization loss, various matls., density effect 932
  - in polarizable matl. 3387, 8451
  - in dielectric medium 6896
- by 31·5 MeV protons, statist. fluctuations 3388
- methyl siloxanes, by electron impact 3389
- mass spectra of aliphatic amines 3392
- photo-, excited Hg atoms 3529
- H_2O_2 by electron impact 4886
- excited H atoms, by electrons, calc. 4887
- single, of atoms or ions by electrons, threshold law 6117
- ionizing capac. of mesons and protons, mag. spectrometer meas. 6898
- by radioactive decay, Br, Tc, In 6900
- atoms, near metal surface, electron reson. transfer 7732
- **gases**
  - by α-particles, of noble gas mixtures 291
    - in A, He, H, N, air, O, methane 933
    - in A, with small admixtures 934
    - gases and mixtures 4885
    - 5 MeV α-rays in He 5009
    - in 14 atomic and molec. gases 6118
    - in A and N 7881
  - ionization loss, various pressures, density effect 932
  - by electrons, in A, He, H, N, air, O, methane 933
  - rarefied gas, deionization and striking potl. 936
  - l.p. discharge, air and N_2, rel. to position in dark space 1664
  - metastable atoms, lifetimes study 1706
  - neg. ion formation, SF_6 1708
  - by corona discharge, factors affecting 1709
  - method for X-ray abs. meas. 1858
  - slow electron diffusion in N and H 2508
  - probability curves for Kr and Xe, near threshold 2510
  - pos. ions due to open elec. heater 2511
  - in air at atm. press. by u.v. from arc 2512
  - air in room, by neg. wire corona 2513, 3327
  - photoionization, importance in l.f. electrodeless discharge 3331
    - role in elec. breakdown 6063
  - generalized formula for plasmas 3390
  - in He, Townsend coeff. calc. 3391
    - fast, in He, A, Xe 4861
    - high-energy, in H_2, He, Ne, A 6116
  - neg. ions, high dielec. strength gases 4176
  - contact potential meas. method 4784
  - in active N, interpret. 5544
  - processes in Hg afterglows 6067
  - in l.p. Hg arc plasma 6820
  - air and rare gases, by X-rays 6830
  - simult. ionization and attachment coeff. meas. 6897
  - mesons in argon 6912
  - in flames (book) 7627
    - in air-acetylene flame 3122
  - specific probable electron ionization, cloud chamber study 7727
  - electron collisions in ionized gas 8478
  - BF_3, electron drift velocity 8479
  - r.f. absorption, espec. shock waves 8591

Ionization—*contd.*
- **liquids**
  - rel. to pH, solns. 2010
  - some fatty acids, thermodynam. 2781
  - Jaffé's column-ionization theory, modification 33
  - by α-particles, in hexane 6904
  - self-ionization in carboxylic acids 7658
- **solids**
  - nuclear emulsions, ionization-loss/density rel. 1103, 6364, 6367, 7370, 8167
  - LiH 4484
  - impurity ionization, semiconductors, chem. eff 6776
  - differential, of CdS by α-rays 8480

Ionization, atmosphere see also *Atmosphere, ra activity; Ionosphere*
- *E*-layer production in O dissoc. region 563
- dynamical phenomena in ionospheric layers 1281
- continuous layer formation by solar radiation 52
- lower, ion balance 7361
- corpuscular stream from sun, longitude effect 883

Ionization, surface see also *Thermionic emission*
- multiple filament source for mass spectrom. 6866
- Zn single cryst., Kramer effect 8442
- pos. ion emission from metals by neg. ion bomba ment 8481

Ionization chambers
- new method of using 277
- cosmic rays *N*-component absorpt. in Pb, meas.
- as flux monitors, and for control, nuclear fiss reactors 1159
- pocket type, X-ray calibration 2640
- thimble, re-entrant 3377
- automatic, for balloon use 3378
- electron drift vel. meas., argon-alcohol mixture, elec. field 3394
- pulsed radiation, saturation curve 3395
- radiation monitoring appl. 4535
- the number of spurious impulses 5535
- B, for pile power-level, calibration 5536
- meas. of angles of particles 5537
- small quantities Rn det. appl. 5668
- spec. activity of radioactive solns. meas. 5669
- 4π gamma-ionization chambers, response impro ment 6107
- grid, electron drift vel. meas. in gas mixt. 6902
- bremsstrahlung flux det. 7109
- H-filled TPA, rel. γ-ray and neutron sensitivit 7739
- low-capacity, construction 7740
- a.c. operation 7741
- liq. A, K^{40} β-ray spectrum shape det. 7886
- free-air standard, error rel. to X-ray energy 8441
- saturation props., effect of space charge 8469

Ionization gauges see *Vacuum gauges*

Ionization potential
- ions, free radicals, molecules, configuration intera tion calc. 998
- Zn phthalocyanine 1707
- stopping power of *K*-electrons 1850
- molec. complexes electron donor partners, rel. spectrum regularities 2341
- H_2O_2, OH 4886
- *K* ionization potls., Mn, Ni, Cu, Zn in soln. 5508
- inert gases, and Van der Waals' *a* 6899
- H_2O, assignment 8625

Ionosphere see also *Electromagnetic wave propagati ionosphere*
- *F*-layer, electron-electron impacts effect in radiowa absorpt. 338
  - splitting 4498
  - wind systems and electron conc. 5237
  - $F_{1\cdot5}$ stratification, rel. to sun's motion 3770
  - *F*1 effect of partial solar eclipse 7349
  - *F*2 centre height, lunar influence 1282
  - *F*2 storms, geo-morphology 2098
  - *F*2, solar eclipse effect 2844, 7394
  - *F*2, travelling disturbances 8812
- recombination, theory appl. 293
  - coeff. and scale height effect on struct. 2843
  - at night, in ionosphere 6903
- sporadic-*E* clouds study at a distance 560

osphere—*contd.*
- radiowave reflection techniques, scatter-sounding 561
  - conf. rep. 2842
  - long-duration 33 Mc/s echoes, from back-scattering 2855
  - *Z* echoes, angle of arrival 3771
  - stratification scattering of 56 Mc/s waves 4231
  - long-delay echoes at 150 kc/s 4234
  - irregularities, study 8811
  - during aurorae and mag. storms 8814
- oblique incidence meas., Eastern Australia 562
- *E*-layer, production in O dissoc. region 563
  - during solar eclipse 584, 5235
  - air movements 8124
- changes correl. with ground pressure and magnetic activity 564
- layers, dynamical phenomena 1281
- long distance radiowave communication, gradients effect 1297
- new early-morning phenomenon 2096
- winds, radio study methods 2097
  - turbulence in arctic region 3466
  - wind and turbulence study, long radiowaves 4499
  - *F*-layer systems 5237
  - conf. rep. 6976
  - wave hypothesis 8125
- conductivity, rel. to geomag. daily var. 2099, 2100, 8120
- abnormalities at high latitudes 2845
- N_1 layer, correl. with aurora 4519
- continuous layer formation under solar radiation 5234
- *D*-layer formation 5236
- tidal motion, theory 5238
- anisotropy, radio-gonometric problem 5595
- ionization, information from v.h.f. propagation 6156
- electron collisional freq., etc., from pressure and temp. meas. 6901
- conductivity, conf. rep. 6976
- variations assoc. with mag. disturbances 7350
- storm phenomena, survey 7351
  - of Feb. 23–8 (1952) 1283
  - *F*2-layer, geo-morphology 2098
  - semi-local rel. to mag. phenomena 4493
  - direction var. of travelling disturbances 5800
  - Continental maps of 4 disturbances 5812
  - conf. rep. 6976
  - *F*2 travelling disturbances 8812
- charac. in Great Britain (1930–46) 7352,
- mechanical model 7353
- height calc. from 16 kc/s wave transmission 7804
- longitude effect of corpuscular stream from sun 8813

osphere measuring apparatus
- invest. by aircraft-launched rockets 6328
- radar echo phase change meas. instr. 7347

s see also *Thermionic emission*
- He, electron ejection from Mo 1693
  - ditto, Ta 7731
- in rocksalt lattices, distortion invest. 2059
- uninegative, u.v. absorpt. spectra 2342
- polar, electric polarizability 2438
- radial oscillations in cyclotron 2497
- neg. atomic, discrete eigenvalue spectrum 2626
- coupled, paramagnetic, neutron scattering 2745
- carbonium, strained, energies 3492
- N_{14}^{+}++, bombardment of light nuclei 3575
- movements in crystals 3722, 7290
- H, scatt. and neutralization in meth- and ethforane 4151
  - molecular, polarizability 7019
  - H_2^+, ground state quadrupole transitions and isotopic ion dipole transitions 8619
- pos. and neg. in c.r.t.'s 4171
- motion in strong fields 4178
- and ion clusters, group IVB elements, by molec. evap. 5524
- positive, range-energy curves, emulsions 5530
- He^+, N^+, Ne^+, A^+, range rel. to energy in gases 6099
- K, reflection from W and Ta targets 6100
  - reflection from oxidized W and Ta 6102
  - reflection from liq. Sn 6103

Ions—*contd.*
- Li, reflection from W and Ta targets 6101
  - reflection from oxidized W and Ta 6102
  - reflection coeff., metal surface 6870
  - sec. electron emission, metals 914
- H, He, N, Ne, energy loss in gases 6868
- radioactive, stability and collection 6900
- energy meas. in gas discharge 7693
- cathode disint. of metals by ions of same metals 7696
- neutralization near metal surface, electron transfer 7732
- rare-earth, in crystals, mag. props. 7797
- He, charge exchange in metals 8477
- magnetic, in dilute alloys, "magnetic binding energy" 8609
- $C_6H_7^+$ and other hydrocarbon ions, hyperconjugation 8624

recombination
- in He 246
- gaseous ions, review 293
- in Kr afterglows 871
- K and Na ions neutralization on W and Ta 939
- neutral H_2 electron affinity spectrum 1710
- ionization chamber saturation curve for pulsed radiation 3395
- radio echoes from meteor trails, decay 4560
- at night in ionosphere 6903
- ion balance in lower atmos. 7361
- He, charge exchange in metals 8477
- in active N afterglow mech. 8614

Ions, electrolytic see also *Conductivity, electrolytic; Dissociation, electrolytic*
- sound attenuation due to ionic relaxation 683*
- H^+ in aq. soln., encaged proton theory 1213
- diffusion through metallic coatings 1215
- mobility at grain boundaries 2011
- strong electrolytes in aq. soln., space requirements 4641
- distrib. in solutions 6290
- ion assoc. of 2–1 salts in methanol 7240

Iridium
- thermal cond., low temp., mag. field 6698

Iron
- new gyromagnetic effect 329
- transformations, proof with needle counter 801
- thermionic constants 937, 2516
- hysteresis at A_3 and A_4 points 1579
- single crystal, magneto-thermoelec. power, low temp. 1650
- α–Fe, ferromagnetic state struct. 1742
- Cottrell–Bilby yield theory modfn. 1983
- high purity, mag. props. in a.c. fields, dissolved O effect 2539
- deformed by rolling, X-ray study 2758
- initial yielding 2769
- films, mag. field effect on resist. 3358
  - elec. conductivity phenomena 4797
- elec. resist. rel. to mag. field 4108
- magnetostriction constants temp. dependence 4236
- cold-worked wires, Matthiessen's rule validity 4422
- oxidation at ∼220°c 4456
- containing V and N, anelastic effects 5123
- surface tension at m.pt. 5323
- pure, Neumann bands 5736
- radio-iron dosage, electrolytic method 5751
- thermal cond., low temp., mag. field 6698
- single crystal domain struct. and magnetization 6961
- carbiding study with C^{14}-labelled CO 7231
- coeff. of cathode disint. in electric arc 7696
- friable cathode deposits, X-ray study 7980
- Bauschinger (work hardening) effect 7995
- electrolytic polishing 8017
  - points produced by, electron micr. study 1182
- liquid, electrical resistance 8396
- magnetic struct., neutron diffract. study 8525
- fine particles, coercive force 8543
- Fe^{+++} magnetization studies, low temp. 8560
- Hall effect, theory 8599
  - temp. variation 5599
  - ditto, electrolytic Fe 5600
- plastically deformed, internal strains 8723
  - magnetization in strong fields 5574
- passivity and Flade potential 8738
- αFe, C interstitial position 8794

A complete list of the Subject Headings will be found at the end of the Index.

Iron alums
  low-temp. spin paramagnetism 970
Iron fluoride
  FeF_2, neutron diffraction antiferromag. study 6132
  magnetic anisotropy 8546
Iron oxide see also *Hematite; Magnetite*
  Fe_2O_3/Fe_3O_4 semiconducting complex, physical processes 843
  ferrites, spontaneous magnetization 958
    magnetic behaviour 1746
  Fe_3O_4 single crystal as neutron monochromator 1156
  Fe_5CuO_8, struct. and magnetic props. 2541
  radioactive Fe diffusion 4403
  powders, magnetic properties 4906
  lattice defects rel. to microwave absorpt. 5392
  liquid, nature of elec. conduction 5470
  Fe_2O_3 with substituted Ti, thermoelect. power 7692
  Fe_2O_3 (haematite), thermomagnetism 7794
  Fe_2O_3 (rhombohedral), ferro- and antiferromag. invest. 8532
  $BaO.6Fe_2O_3$, saturation magnetization at 0°K 8542
  Fe and Co mixed oxides, magnetization study 8574
    magnetostriction, X-ray det. 8603
  properties reqd. for magnetic recording 8581
Iron sulphate
  ferrous ammonium sulphate, anomalous spec. ht. 3270
  betatron irradiation 5174
  ferrous, oxidation in H_2SO_4 by radon radn. 8028
Iron sulphides
  FeS_n, Yosida's theory of paramagnetism 317
Isomerism see also *Nucleus, energy levels*
  rotational, as general alkyl nitrites property 132
    of chloroacetyl chloride, bromoacetyl chloride and bromide 1016
    configurations, normal frequencies 3497
    theory of polymer melting 5764
    in chloroacetone 7258
    dihalogenoethane, energy difference 8037
  cyclohexane disubstituted derivs., i.r. spectra study 5763
Isomerization
  thermal, *trans-cis*, of dideuteroethylene 1229
  cis-butene-2, Na photosensitized 1230
Isotope separation see also *Radiochemistry*
  thermal diffusion, improving efficiency of column 72
    in critical region 2251
    spiral column, theoretical yield 7058
  calutron charge materials 390
  enrichment method for Knudsen- and Poiseuille-flow transition range 1040
  Zn ion migration in fused ZnBr 1216
  chem. method, as rectification problem 2627–8
  photoexcitation of specific isotopes 2629
  Hg^{202}, photochem. enrichment 3535
  continuous, cascade-type enrichment 4972
  light and medium elements, e.m. separator 5527
  continuously operating separation tubes 6189
  C isotope thermal conc., using CO 6190
  fractional distillation, approach to equilibrium 7055
    optimal flow columns 523
    O^{18} from H_2O 3707–8
    water, O^{18} and H^2 discrimination 7054
    water, laboratory still construct. 7056
    in organic liquids 7854
  isotopic exchange between O and water, catalysis 7057
  by high-speed centrifuges 7852
  $Na^{22, 24}$ by diffusion in elec. field 7853
Isotopes
  shift between RaD and Pb isotopes 1499
  complete table of properties 7061
 detection see also *Mass spectra; Radioactivity*
  Pb analysis in minerals 6188
 relative abundances see also *Elements*
  common Pb, variations 2093
  Sr^{86}/Sr^{88} variations in mineral sources 2630
  C, Si, Ge, Sn, Pb tetramethyl mass spectra 3393
  H, in steam wells 4297
  D, in solar atm. 4564
  mass spectrom. meas., residual peaks present 4970
  Nd, mass spectrometer det. 4971
  nuclear resonance spectrometer det. 5658

Isotopes—*contd.*
 relative abundances—*contd.*
  Pb isotopic composition and earth's age 5798
  in stars, etc., conf. rep. 6437
  isotopic constitution of Si, Ge, Hf 7059
  C^{13}/C^{12} in CO_2, infrared analyzer 7060
  O^{18}/O^{16}, in fossil shells, effect of deposition te 7346
  He^3, He^4, in meteorites 8510
  Li^6 content of Li salts, photographic plate met 8645
Jets see also *Sprays*
  hypersonic nozzle, N condensation 187
  emerging from plane wall, viscous flow eq. 642
  fast, from collapsing cylinders 643
  axially symmetric, mixing of compressible fluid 6
  liquid, study with multi-flash camera 1325
  horizontal, effect of weight on form 2993
  formation in high-vol. collisions, limiting conditi 2994
  nozzle flow, trans-sonic 3024
  sensitive bubble jets 3908
  mechanics of edge-tones 3938
  H, sensitive to u.s. vibrations 5327
  noise from, exptl. studies 5359
  radiation pattern of acoustic noise 5366
  impinging, in liq. stream, Schlieren study 5884
  plane, of gas, emitted at supersonic vel. 5902
  supersonic, inviscid, past infinite wedge 7509
  sounds of, review 7521
  turbulent, Schlieren sound field photographs 752
  water, sensitive to sound 7534
Joule–Thomson effect
  work equiv. meas., thermodynam. theory 204*
  meas. of coeff. for N_2, C_2H_4, CO_2, N_2O 6550
***K*-capture** see *Radioactivity, electron capture*
Kerr effect see *Electro-optical effects; Magneto-opt effects*
Kinematical relativity see *Relativity, kinematical*
Kinematics
  rocking expt., 2 degrees of freedom 3889
  point mass motion in variable-density medium 4
Kinetic theory
  virial theorem in Thomas–Fermi theory 1439
 gases see also *Association, gases; Brownian movem Collision processes; Diffusion; Equations of st Joule–Thomson effect; Molecules, intermolec mechanics*
  transport properties relationships 79
  binary collisions influence on molec. gas flow 80-
  intermolec. force and self-diffusion coeff. 658
  monatomic gases, translational dispersion 677
  shock wave structure theory 679
  acoustic relaxation, van der Waals gas 682
  3rd virial coeffs., A, N_2, CO, CO_2, CH_4, C_2H_4, C Xe 1438, 2259
  "compressed He atom," ground state 2255
    polarizability 2256
  internal k.e. and polarizability of compressed A 2
  low temp. 2nd virial coeff. 2258
    6–9 potl. 664
    Lennard–Jones gas 665
  virial coeffs., quantum-mech. treatment 2260
  high pressure thermal conductivity 2402
  Knudsen effect, irreversible processes appl. 2418
  2nd sound propag. conditions calc. 2420
  electron gas mixture absorption 2429
  mixtures, thermal diffusion, forces between un molecules 3015
  inelastic molecular collision, energy transfer 302
  thermal conductivity theory 3230
  interacting particles structure function, asympt expression 3932
  expansion into vacuum 3941
  condensation theory 4055
  critical state hypothesis 4057, 8364
  motion of ions in strong fields 4178
  systems with arbitrary no. of integrals 4623
  thermal diffusion (book) 4648
  flow, composite distrib. of velocities due to mc agitation 4652
  Boltzmann's eq. in quantum mech. 4658
  phys. chem. treatise (book) 5147

inetic theory—*contd.*
 gases—*contd.*
  molec. distrib. function in 1-dimensional fluid 5904
  sound dispersion in *cis-* and *trans*-dichloroethylene vapours 5915
  random flight problem in *k*-dim. space 6490
  thermal molecular velocity meas. 6529
  critical thickness of film for neg. press. 6548
  molecular polarization 6549
  density virial coeffs. rel. to press. virial coeffs. 6551
  Van der Waals' *a* and ionization potl., inert gases 6899
  molecular theory of fluids (book) 7498
  math. theory of non-uniform gases (book) 7512
  neg. cluster concentrations 7513
  deviations from corresponding states principle 7646
 liquids see *Liquids, theory*
rypton
  compressibility, eq. of state and wt. per litre 75
  virial coeffs. and potential parameters 76
  radiation emitted in condensed discharges 250
  ions, drift velocities in parent gas 292
  afterglows, electron removal 871
  rarefied, de-ionization process 936
  ionization probability curves near threshold 2510
  proton energy losses 4874
  magnetic rotary power 7809
aboratories see also *Acoustical laboratories*
  radioactive Co lab. for chem. research 4298
aboratory apparatus
  high-efficiency gas-flow control device 524
  for controlled atmosphere research 2036
  gas microintroductor for adsorption studies 3696
  for liquid-liquid and liquid-solid equilibria, corrosive matls. 6279
  a.c. electromag. pump for liq. metals 8042
  variable temp. and humidity oven 8753
  automatic O absorption recorder 8754
anthanum
  elec. resistivity, low temp. 840
  paramagnetic resonance absorption 5568
  thermal cond., low temp., mag. field 6698
  thermal expansion anomalies 7624
  boride, as thermionic emitter 297
  nitride and hydride, powders, supercond. invest. 4107
atent heat see *Heat of adsorption, etc.; Thermodynamic properties*
attice dynamics see *Crystals, lattice mechanics; Spin-lattice coupling*
ead
  vapour, in discharge lamp 176
  specific heat, 1–75°K 815
  de Haas–van Alphen effect at high fields 974
  u.s. waves velocity 1448
  $Pb_2Nb_2O_7$, ferroelectricity 1611
  superconductive, heat conductivity below 1°K 1647
  acoustical props. at liq. N temp. 2272
  anomalous skin effect invest. 2458
  liq., neutron diffraction rel. to atomic distrib. 2747
  liquid, X-ray scatt. structure det. 2757
  deformed by rolling, X-ray study 2759
  jet formation in high-vel. collisions 2994
  isotopic ratios from tetramethyl mass spectra 3393
  liq., interfacial tension with liq. Zn 5324
  isotopic composition and earth's age 5798
  u.s. wave absorption 5918
  thermal cond., low temp., mag. field 6698
  superconductive transition 6802
  single crystals, dendritic growth 7274
  $PbHfO_3$, antiferroelec., phase transitions 7656
  coeff. of cathode disint. in electric arc 7696
  foil, electron energy loss distrib. 7723
  Bauschinger (work hardening) effect 7995
  elastic wave velocity rel. to temp. 8285
  PbN_6 crystals, explain invest. 8735
ead fluoride
  single crystal, i.r. transmission limits 3148
ead nitrate
  aq. soln., ultrasonics influence 1214
  photoelastic constants 8346
ead oxide
  inhibiting effect on methane slow oxidation 2800
  self-diffusion det. 5121
Lead selenide
  optical constants, 0·5–3 μ 3093
  intrinsic conduction 3299
  thermo- and galvano-magnetic coeffs. 3304
  photocond. cells in i.r. spectroscopy 6605
Lead sulphide see also *Galena*
  sintered, conductivity and Hall coefficient 226
  photolayers, noise measurements 2448
  optical constants, 0·5–3 μ 3093
  absorpt. edge and photoconductivity limit rel. 3130
  intrinsic conduction 3299
  carrier injection and extraction 3301
  thin film capacitance effects 4093
  transistor action and related phenomena 4098
  electronic band structure 4241
  superconductivity invest. 4814
  layers, optical and photoelec. props. 5393
  photoresistances, effect of O on elec. and photoelec. props. 6055
  photoelec. and optical props. of special cell 6056
  photoconductivity, effect of O 7677
Lead telluride
  single crystals, transistor action 2456
  optical constants, 0·5–3 μ 3093
  and Si, optical constants inter-rel. 3094
  intrinsic conduction 3299
Lead titanate
  domain structure, refr. index 8761
Length measurement see also *Altimeters; Curvature measurement; Micrometry; Strain gauges; Thickness measurement*
  microwave methods 124
  end-gauge and slip-gauge, interferometric comparison 2220
  displacement, linear transducer method 2221
  small displacements, thermionic device, theory 2222
  by reversible fringe counting 5980
  rubber tubing dia., continuous, by projector 6687
  extensometer of high sensitivity 7478
  range-finding, the stereoptometer 8148
  echo sounding, underwater spark as source 8300
  with N.P.L. gauge interferometer, spectrographic unit for 8344
Length standards
  lightwave, present state 2970
  wavelength method, development 2971
  line standards, photog. comparison method 8246
Lenses see also *Electron lenses*
  corrector, for Palomar telescope 579
  refraction formulae, Maxwell's eq. appl. 724
  testing bench 1566
  flare, meas. and origin invest. 2313
  Fresnel, aberrations 3085–6
  catadioptric microscope objectives 4050
  continuously varying refract. index, eq. 4685
  long focal length, zonal aberrations, 3rd-order methods 4689
  silica, containing Hg vapour, reflection factor 5416
  spectacle, toric wavefronts theory 5938
  between source and illuminated surface, effect on illuminance 7538
  representation by pure resistance quadripoles 7714
  image quality of objective with 3rd-order spherical aberration 8307
 aspherical
  astigmatic error compensation, grating spectrograph 6602
 photographic
  distortion, precision meas. method 3088
  objectives, photoelec. contrast measurements 6349*
  performance eval., contrast and resolving power combination 8157
Light see also *Diffraction, Interference, etc.; Doppler effect; Radiation*
  textbook 98
  quantal struct. and the visual mechanism 1306
  reversible and irreversible operations, thermodynam. criteria 2306
  deflection by electric field 4676
  wave propag. from instant. point source 4679
  variations calc. appl. to trajectories 4684

Light—*contd.*
- **electromagnetic theory**
  - textbook 98
  - Maxwell's eq. soln., optical formulae appl. 724
  - inhomog. absorbing medium, wave-normals, eq. 2310*
  - white light propag. in vacuum 3451
  - optics in generalized field theories 3859
  - wave field in front of concave mirror 4669
  - resonance excitation in Hg vapour 4678
  - propagation through crystal plate 6578
- **quantum theory** see *Field theory, electromagnetic; Photons; Radiation, theory*
- **velocity** see *Velocity, light*

Light sources see also *Monochromators; Photographic light sources; Spectroscopy*
- discharge lamps with metallic vapours 176
- W lamp, precision colour temp. meter 723
- colour properties, physical and practical aspects 785
- square waveform pulses generator 1568
- for far u.v. photochemical reactions 2020
- colour (text-book) 2393
- ultraviolet radiation (book) 2394
- Xe resonance lamp, charac. 2788
- C.I.E. sources *A*, *B* and *C*, spectral energy distrib. 3197
- white light, standard, for colorimetry 3964
- fluorescent lamps, standard observer data at 4358 Å check 4749
- fluorescent lamps, colour-rendering props. 5430, 6679
- curvilinear, photometry 6585
- flash tube, luminous efficiency 6690
- Hg lamps, h.p., phosphors for luminosity correction 7587
- attenuation to very low levels 8303

Lighting see *Illumination*

Lightning
- comparison with lab. discharges 246
- upward streaks mirage 1290
- radiation of elec. field variations 1294
- 10 years' meas. of currents to Empire State Bldg. 1295
- wave spectrum and propagation 1787
- radar observation 2848
- ball lightning, theory, "flying saucers" appl. 2854
- air discharges mechanism 5253
- horizontal cloud discharges, Boys camera invest. 5254
- spectrum in λ6159–7157 region 5255
- bursts of radio signal following 5589
- v. long wave propagation along earth's surface 6155
- areas of high risk 7364
- rel. to radio propagation, conf. rep. 7366
- occurrence rel. to altitude and longitude 8816
- waveform of atmospherics 8819

Liquefaction, gases see also *Low temperature production*
- He liquefaction plant 807
- big expansion He liquefier 1584
- H, partially converted 2422
- interchanger for large liquefiers 2423
- plant for liq. air from liq. O 3262
- miniature He liquefier-cryostat 4766
- H liquefier 6011
- physics of (book) 8366

Liquid crystals
- proton magnetic reson. line 3435

Liquid helium
- adsorbed on silica gel, heat cond. and isotherms 805
- liquefier 807
  - big expansion 1584
  - miniature liquefier-cryostat 4766
- latent heat and vap. density 1586
- He cryostats below λ-point, film flow 1587
- melting curve, 1·5° to 4°K 2412
- λ-point, molecular theory 3250
- viscosity coeff., quantum-mech. treatment 4058
- unsaturated film, review 5440
- X-ray scatt. invest. of struct. 6250
- thermal expansion, theory 6722
- the λ-transition 6724
- solid/liquid equilibrium 6725
- quantum hydrodynamics of 6726
- superflow through powder 6727
- Bose–Einstein condensation 7635
- properties (book) 8366
- molec. theory, λ-point trans., coop. charac. 8371

Liquid helium—*contd.*
- zero-point energy and classical model of rotor 83
- He I viscosity, press. influence 2417
- He II, solidification curve 189
  - cavitation effect 190
  - heat pulses below 1°K 804
  - heat exchange with solid body 806
  - heat transfer through fine slit 7637
  - boundary layer heat conduction 2413
  - transport phenomena, narrow slits 2416
  - irreversible processes 2418
  - normal fluid conc. below 1°K 3251
  - fountain effect below 1°K 6728
  - anomalous surface tension 8368
  - adsorption on glass 8369–70
  - rotating-cylinder viscometer expts. 8374
- He II film, transport over Cu below 1°K 191
  - formation 4060
  - optical study 4061
  - bulk liq. formation from 4765
  - transport variation with height of film 5441
  - thermodynamics 6009
  - transfer rate 6010
  - adsorbed, thickness 7636
- He II hydrodynamics 3256, 6721
  - limitations of model 2414
  - He II, non-viscous fluid hydronamics 3255, 837
  - solutions of extraneous particles 5443
- He^3, nuclear alignment and entropy 2415
  - properties 3252
  - vap. press. and entropy 3254, 8372
- He^3–He^4 mixtures, vapour press. 1585
  - ditto, below λ-point 188
  - He I/He II transition, thermodynam. 2411
  - vapour-liquid equilibria 3253
  - superfluid, macroscope theory 4059*
  - concentration method 6007
  - saturated vap. press. cluster theory 6008
  - deviations from Raoult's law, theory 6723
- **sound propagation**
  - thermal Rayleigh disk meas., He^3–He^4 mixtures 1 3261
  - passage through thin metallic foil 806
  - 1st and 2nd, through He II 2419
  - velocity, calc. for media other than He II 2420
    - below 1°K 2421
    - ditto, rel. to press. 3259
  - kinetic coeffs. in He II 3257–8
  - heat pulses in He II below 1°K 3260, 6730
  - phonons and rotons 4062
  - in solutions of extraneous subst. in He II 5444
  - shock waves 5445
  - 2nd sound vel. in He^3–He^4 below 1°K 6729

Liquid oscillations
- free, tidal, in rotating sea 1353
- water contained by plane walls 5888
- standing wave instability 6518

Liquid waves see also *Acoustic waves*
- mass transport in water waves 2997, 3911
- pulse between parallel plates 3032
- formation in moving liq. film 6523
- surface and interfacial, velocity potential 8255
- gravity waves, long-wave paradox 8257
- irrotational, vel. decrease with depth 8259
- **surface** see also *Tides*
  - wave-recorder for use in ships 1277
  - generation by wind 2235
  - gravity waves symposium 2998
  - ripple recording instr. 3912
  - standing waves, instability 6518
  - ocean wave infrasound generation 6561
  - in annular tank 7488
  - solitary wave problem, approx. soln. 7489
  - sea, photomech. analyser for Fourier anal. 8177
  - cylindrical, velocity potential deriv. 8255
  - $\nabla^2 u + \lambda u = 0$ eigenvalues for boundary condition semi-infinite domains 8256
  - wave-height analyser 8258

Liquids see also *Association, liquids; Diffusion, liquids*
- **structure**
  - solutions of mixed salts, optical props. 69
  - dielectric polarization, polar liquids 827
    - extrapolation formulae 1606

A complete list of the Subject Headings will be found at the end of the Index.

quids—*contd.*
structure—*contd.*
  X-ray diffraction studies, halos with Pb–Sn alloys 1181
    liq. Sn, Bi, Pb 2757
    caramel sugar solns. 4412
    intensities det. method 8265
  d.c. field influence on adhesion tension 1414
  cell theory extension to polar liq. 1424
  acoustic wave studies, u.s. waves demodulation 1447
    u.s. absorpt. in ethyl alcohol and water mixt. 2268
    5 Mc/s absorpt., from thermal considerations 2269
    light beam propagation with u.s. irradiation 2388
    u.s. internal dispersion expts. 3000
    behaviour of ultrasonics, review 3043
    sound intensity at source, rel. to absorpt. coeff. 3045
    u.s. absorpt. studies, symposium 3949
    liq. mixtures, u.s. absorpt. 3950
    liq. O, N, A, CH$_4$, H, velocities 4664
    organic compds., u.s. vel. and adiabatic thermodynam. prop. 4665
    u.s. propagation in partially mixed liq. systems 4667
    u.s., electrolyt. solutions 5747
    absorpt., electrolyte aq. solns., 3 to 100 Mc/s 5916
    absorpt. in water and aq. solns., 5 kc/s to 1 Mc/s 5917
    absorpt. coeff. rel. to radiator intensity 5921
    molec. sound vel. and compressibility, liq. mixtures 6527, 7526
    damping of oscillating quartz 7533
    heat due to u.s. waves, rel. to absorpt. 8292
  HNO$_3$ and aq. solns. 1550
  Kerr effect in Onsager liquids 1628
  solution surface, adsorption kinetics 2030
  compared with solids 2237
  review of theories 2238
  nucleic acids in soln., Maxwell's effect appl. 2250
  nuclear mag. reson. multiplets 2617
  Pb and Bi, neutron diffract. rel. to atomic distrib. 2747
  internal dispersion of optical waves 3002
  polarized components of scattering, rel. to temp. 3188
  atomic distrib. curves, liq. O 3920–1
  effect of pressure, CS$_2$ organic mixtures 3922
    on diffusion 3923
    aq. and alcoholic salt solns. 3924
  supercooled H$_2$O and D$_2$O 5319
  electronic conductivity rel. to short-range order 6033
  monatomic fluids, radial distrib. functions 6741
  bonding of neighbouring atoms, group IVB elements 7490
theory see also *Dielectrics, theory; Equations of state*
  multi-component mixtures, free volume theory 67
  3rd virial coeff. in polymer solns. 68
  strong electrolytes, statist. theory 654–5
  Onsager's phenomenological relations 1419
  crystallite theory, suggested modification 1420
  Born–Green theory of binary mixtures 1421
  cohesion theory of polar liquids 1424
  dielec. and ultrasonic relaxation rel., glycerol 1456
  kinetic theory, gases, and solid-state theories, appl. 2226
  press. rel. to intermolec. forces 2236
  compared with solids 2237
  review of theories 2238
  transport processes 2239
  viscosity, metallic liq., supercooled polar liq. 2240
  supercooling, theory 2241
    supercooled polar liq., viscosity 2240
    discontinuities 2242
    spontaneous nucleation, supercooled water 2243
  Na in liq. NH$_3$, electron stability 2245
  dipole liquids, dielec. relaxation 2436
  calculation of specific heat, compressibility, etc. 2999
  molec. motion, rel. to wave dispersion and absorpt. 3001
  Lennard–Jones partition function modification 3003
  rel. to scattering theory 3004
  molecule interact. energy rel. to orientation 3008
  regular mixtures theory, approximation methods 3009
Liquids—*contd.*
theory—*contd.*
  solution-cell model, mixing nonrandomness 3010
    partial molar quantities 3011
    in critical soln. phenomena 3012
    appl. to *r*-mer liq. 3916
    appl. to soln. statist. thermodynam. 3918
  Callendar's hypoth. of saturated water 3280
  hydroferrocyanic ion dissoc. in soln., kinetics 3686
  stress tensor calc. 3897
  r-mer liq., cell method appl. 3916
    solns., statist 3917
  diatomic gas absorpt. by molten alloys 3919
  electrolyte solns. conductivity and viscosity 4445
  space requirements and activity coeffs., strong electrolytes 4641
  fusion as order-disorder transition 4779
  phys. chem. treatise (book) 5147
  dipole liquids, theory 5893, 8264
  binary mixture, molec. distrib. functions and thermodynam. rel. 6528
  kinetic theory of electrolytic ion migration 7246
  diffusion in binary systems 7493–4
    in CCl$_4$–SnI$_4$, press. effect 7495
  molecular theory of fluids (book) 7498
  quasi-chem. approx. for cooperative orientation, solns. 7501
  deviations from corresponding states principle 7646
  dielec. const. theory, polar liquids 7655
  molecular distribution functions 8263
  universal theorem of conc. mixtures, solns. appl. 8268
  critical point and disturbed rotation 8365
  roton, classical model 8373
  Lennard–Devonshire, appl. to pentaerythritol tetranitrate detonation 8734
Lithium
  elec. resistance temp. dependence 1644
  ions, refl. from W and Ta 6101–2
    refl. coeff. at metal surface 6870
  low temp. plastic deformation effect on structure 6271
  conducting plate, magnetic dispersion of sound 6570
  diffusion into Ge and Si 7196
  salts, isotopic composition, photog. plate method 8645
Lithium borate
  as molten solvent in cryoscopy 7492
Lithium fluoride
  transparency rel. to temp., Schumann region 140
  internuclear distance and dipole moment 1019
  commencement of fracture, optical invest. 5739
  irradiated, absorpt. bands, etc. and colour centres 6646
Lithium hydride
  ionic state in crystal 4484
Loudspeakers see *Acoustic radiators*
Low-temperature phenomena see also *Joule–Thomson effect; Liquid helium; Superconductivity; Superfluidity*
  N condensation in hypersonic nozzle 187
  powdered paramag. salts, He diluted, demagnetization, cavitation effect 190
  elec. resistance minimum in Cu, Ag, Au alloys 215
  degenerate Ge sample, Hall curve 227
  de Haas–van Alphen effect enriched Sn isotopes 327
    number theory appl. 949–50
    at high fields 974
    interpretation 1753
    electron gas considerations 2551
    with large electron systems 8511
  2nd virial coeffs., for 6–9 potl. 664
    Lennard–Jones gas 665
    near 0°K 2258
  Pb, spec. heat, 1°K to 75°K 815
  Ag atomic heat anomaly 816
  Si atomic heat below 100°K 817
    neutron bombard-effect 1801
  La, Ce, Pr, Nd, elec. resistivities 840
  antiferromagnet parallel susceptibility 960
  ferric acetate and benzoate susc. down to 2°K 966–7
  Cr^{+++}, Fe^{+++}, Gd^{+++} spin paramagnetism 970
  paramag. alums, Cr^{+++} props. 971
  alkali halide colour centres, at 5°K 1251
    generation 5170–1

A complete list of the Subject Headings will be found at the end of the Index.

Low-temperature phenomena—*contd.*
liq. A viscosity and thermal conductivity rel. 1406
metals, optical and i.r. reflectivity 1556
Cr alums, phys. props. 1573
superconductive Pb heat conductivity below 1°K 1647
Zn single crystals, Hall effect 1793
Cu cold working studies 1992
Pb, Cu, Al acoust. props., liq. N temp. 2272
thermal radiation, 1°K and below 2305
spectroscopy, in farther u.v. region 2320
polycrystall. solids, thermal conductivity 2400
Kroll method convergence, extreme low temp. 2401
Ga sp. heat, T^2 dependence 3271
NpO_2, heat capacity 3273
Si i.r. photoconductivity 3312–13
Fe film, mag. field effect on resist. 3318
ferrous and Zn ammonium sulphates, anomalous spec. hts 3270
metal resist, rel. to mag. field 3319
Jaffé's column-ionization theory 3396
graphite spec. ht., statist. expression 3716
Pd–Ag alloys, thermal and mag. props. 4064
Au elec. resist., v. low temp. 4105
Ni ferrite, magnetic transition 4209–10
electromagnetic vacuum theory 4595–6
viscosity difference, *o*- and *p*-H_2 4633
  o- and *p*-D_2 6511
thermal conductivity, of dielectric solids 4757
  of metals 4758
  of metals in mag. field 6698
thermodynam. appl. (book) 4777
elec. conduction, extremely degenerate semiconductors 4802
Sn and Ag thermoelec. powers, liq. He temp. 4817
Hall effect in Be and Al 4938
In atomic heat, 12° to 273°K 6014
BN sp. ht., T^2 dependence 6015
irreversible processes, thermodynam. anal. 6023–4
device for cyclic adiabatic demagnetization study 6148
plastic deformation, metals, rel. to struct. 6271
crystalline Se sp. ht. 6736
diamagnetism of electrons in cylinder 6805
elect. resist. of noble metal alloys in magnetic field 6809
$CH_3NH_3 . Cr(SO_4)_2 . 12H_2O$, adiabatic demagnetization 6949
friction and lubrication 7225
liq. N, tensile strength 7479
CeMg nitrate, mag. prop. and sp. ht. 7630
  entropy rel. to *T*, below 1°K 7631
Be, sp. ht., 4°K to 300°K 7633
cyclohexanol dielectric behaviour 7657
heat conductivity of Sn, In, Tl, Ta, Cb and Al 7688
thermoelectricity in Na, K, Cu 7690
nuclear magnetic resonance, solid H 7796
magnetic anisotropy of organic crystals 7798
elastic constant meas., u.s. method 7989
Nd ethyl sulphate spec. ht., nuclear and electronic contrib. 8385
transformation in ferrites (magnetite), magnetic study 8533–4
antiferromag. resonance, in rhombic crystal, $T = 0$ 8539
  $CuCl_2 . 2H_2O$ crystals 8540
$BaO . 6Fe_2O_3$ saturation and magnetization at 0°K 8542
Cr^{+++}, Fe^{+++}, Gd^{+++}, Cu^{++}, magnetization studies 8560
Fe–Co mixed oxides, magnetostriction, X-ray det. 8603
dil. alloys, elec. resist., theory 8609
O spec. heat below 4°K 8384
low temp. physics (book) 8366
naphthalene, anisotropic thermal expansion 8798
Low-temperature production see also *Joule–Thomson effect; Liquefaction, gases*
Ranque vortex tube invest. 808
adiabatic demagnetization, and temp. scale below 1°K 1589
  apparatus 8376
  magnetic refrigerator for temps. <1°K 8377
thermostat for reaching 50°K without liq. H 3263
refrigerating machines, dynamic heating cycles 6019
  combined cycles 6020
Low-temperature technique
X-ray powder camera 538
temp. meas. thermocouple, recording and indicati inst. 1590
partially converted H, liquefaction and storage 24
heat interchanger for large liquefiers 2423
plant for liq. air from liq. O 3262
miniature He liquefier-cryostat 4766
bath for const. temp. studies 6005
cryostat for mag. susceptibility meas. 6006
graphite resist. thermometer 7639
elec. resistivities, liq. He temp. meas. 7665
"heating" by γ-rays below 1°K 7897
  in low temperature calorimetry 7634
Al elast. const., piezoelec. meas. 7988
app. for low temp. calorimetry 8367
Lubrication see also *Friction*
oil-film formation in gears, elec. resist. meas 1200
at low temperatures 7225
metals, with rosin, wax, graphite, talc. 8728
Luminescence see also *Counters, scintillation; Fluoresce screens*
scintillators, and energy transfer processes 147
  nature of satn. effect 155
  liquid, counting props., review 279
  solid and liquid, for particle detect. 1700
  phosphors, decay, slow component 2378
  scintillation counters (book) 6884
  liquid, ageing 8470
admixtures in dielectrics, theory 747
fluorescence quenching by foreign substances 768
aq. solns. of radioact. isotopes, Cherenkov effe 769, 3173
i.r. sensitive phosphors, development history 773
electroluminescence, rel. to field and temp. 776
  mechanism 5413
  initial rise, explanation 5414
  dielec. changes during illumination 6666
  by alternating electric field, primary effect 7602
after-glow effects spark discharges 867
charged particle ionization loss in scint. matl density effect 932
fluorescence in photog. emulsions, effect on sensitivi 2122
rise and decay meas., compensating method 2372
surface temp. meas., aerodynamics, phosphor app 3026
ultraspeed pellet, time-resolved spectroscopy 3095
electron trapping states in phosphors 3159
associated adsorption effects 4721
phosphors with sulphate bases 5402
sensitized, in solids, theory 5404
thermoluminescence as research tool 5415
fluoresc. mech. in emission band prod., comets 64
solids, theory 6981
kinetics of phosphorescence 7585
dissolved subst. fluoresc. lifetimes, phase sh method 7590
K-level fluorescence yield, direct det. from X-ray li breadths 7706
phosphor in elect. field 8330
phosphors as detectors of heat and ultrasoni 8333
field emission of crystal phosphors 8334
fluorescent light yield with α, β and γ radn. 8340
chemiluminescence during combustion 8342
gases
  air, α-particle irradiated 3174
  argon, high temp. and pressure 5406
inorganic substances
  divalent Mn in solids, nature of emission 770
  emission and trapping in phosphors containing (1545*
  phosphor efficiencies under cathode-ray excitati 1555
  scintillation crystals, energy dependence 2376
  fluorimetric det. of U in ores 4460
  atomic Hg as activator 4736
  excited state lifetime, rel. to activator lifetime 54
  fluorescence, effect of on phosphorescence, theo 6649
  quantum efficiency of powders, calorimetric det. 66
  rel. to coloration in minerals (book) 7295

A complete list of the Subject Headings will be found at the end of the Index.

uminescence—*contd.*
- **inorganic substances**—*contd.*
  - alkali halides, X-irrad., u.v., excitation levels effect 3170
    - iodides, scintillations 5405
    - decay meas. 5971
    - cathode-ray excited, afterglow decay 6665
    - Tl^+ effect 8329
  - diamond, unusual phosphorescence 2373
  - glass, α-particle irradiated 3174
    - containing Ti and heavy metals 4009
  - halophosphates, u.v. absorpt. meas. by diffuse reflection 1537
  - ice, and tritiated ice 146, 1542
    - thermoluminescence 3175
  - quartz, new kind of luminescence 772
    - α-particle irradiated 3174
  - sulphides, u.v. excited, r.f. field quenching 771
  - ruby, decay of phos. 6648
  - thoria phosphorescence 6657
  - willemites, u.v. absorpt. meas. by diffuse reflection 1537
    - containing Mn and Fe 1544
    - temp. dependence 2371
  - $AlPO_4$, cathodoluminescence 7596
  - BaO, rel. to temp. 4031
  - Ca compounds 3151
  - 2 CaO . Al_2O_3 . SiO_2–Ce and ZrP_2O_7, for flying-spot c.r.t.'s 1549
  - CaF_2, coloured by X-rays, thermoluminescence 2369
  - CaO(Pb, Sm) and (Pb, Pr) 7589
  - $CaSiO_3$ props. 4029
  - CaS, electron capture and recapture 2364, 4726
  - Cd borate afterglow 6654
  - CdS, single crystals, strong d.c. fields 766
    - phosphorescence, elec. conductivity rel. 1546
    - at absorpt. edge 1547
    - Cu-activated, i.r. photoluminescence 5403
  - CsI, α-particles 7601, 8339
  - KCl–Ag, energy storage 7591
  - KCl–Tl, electron traps 2368
    - atomic position and size of Tl ions 6656
  - KI–Tl, absorption spectra 5391
    - by heavy charged particles 8338
  - Li compounds, u.v. and α-particles response 281
  - LiI, activation by Eu 4026
  - Mg arsenate basis, Mn activated 7587
  - MgO, tetravalent Mn activated 3155
  - $MgWO_4$, light yield on bombardment 1543
  - NaCl–Ag, α-particle induced 4036
    - energy storage 7591
    - atomic and ionic Ag centres 8328
  - NaCl–Cu, ionic and atomic centres 7588
  - NaI scintillators, surface effect 5970
    - Tl-activated, response to pos. ions 5976
  - SiC, green crystal, due to elec. current 1554
  - $ZnBeSiO_4$: Mn semiconducting conductivity mechanism 220
  - ZnF_2: Mn, electron irradiated, luminescence-diminution 8331
  - Zn selenide phosphors, intensification 4725
  - Zn_2SiO_4, field-dependent, electroluminescence 156
    - Mn-activated, light yield on bombardment 1543
    - Mn activator ion interaction 3161
    - Mn-activated, cathodoluminescence invest. 3172
  - ZnS, electron capture and recapture 2364, 4726
    - quenching of photoluminescence 3154
    - neutron bombard. effect 3156
    - fluoresc. centres and traps 3157
    - electroluminescent, absorpt. and emiss. spectra 3158
    - electronic transitions 4030
    - fluorescence excited by α-particles 4735
    - screen, response to α-rays < 5 MeV 6886
    - Cl microdosage, radiochem. method 8030
  - ZnS-type, uniform-response, nonhydrogenous screens, prep. 148
  - ZnS–Ag, light yield on bombardment 1543
  - ZnS–Cu, new charac. 1541
    - film, elec. field influence 3176
    - pressure-induced lattice defect effect 5972
  - ZnS–Cu, Co phosphor, thermal and i.r. extinction 7586

Luminescence—*contd.*
- **inorganic substances**—*contd.*
  - ZnS–Mn, electroluminescence when sensitized by Cu 4027
  - ZnCdS powders, induced conductivity 2380
  - ZnCdS–Ag, multiple emission bands 1553
  - ZnO, thermoluminescence and "photo-dielectric" effect 7583
- **organic substances**
  - plastic scintillators, satn. effect 154
    - Plexiglass, new kind of luminescence 772
    - process in solid solns. 7592
  - anthracene, neutron scint. spectrometer appl. 478
    - energy dependence 2376
    - efficiency for γ-ray excitation 2379
    - scint. counter eff. for low-energy electrons 4878
    - abs. scint. efficiency for α-particles 6890
    - decay time meas. 8332
    - in naphthalene, mixed crystals, fluoresc. charac. 8341
  - fluorescence mech. and decay, acridine-orange 767
    - acetone vapour 2367
    - decay on particle and photon irrad. 4035
    - biacetyl vapour 4028
    - decay times, solns., with new fluorometer 6650
    - aromatic hydrocarbon solid soln., decay times 5969
    - dyestuffs decay time, phase tube meas. 4723
    - anthracene, stilbene, diphenylacetylene, decay times meas. 8332
    - anthracene in naphthalene mixed crystals 8341
  - phosphors efficiency for high-energy protons and mesons 930
  - scintillations in soln., mech. 2363
  - butadiene derivs., diphenyl and tetraphenyl-1144-butadiene, polarization 2365
    - para-terphenyl and tetraphenylbutadiene in polystyrene, scint. phosphors 3152
    - tetraphenyl 1144 butadiene 13, low temp. 6658
  - fluorescence polarization, diphenyl and tetraphenyl-1144-butadiene 2365
    - dissoc. molecules 3153
    - pyrene, phenanthrene, benzil 3160
    - dyestuffs, polarization rel. to wavelength 4722
    - in crystals 5401, 6653
  - new high-efficiency scintillation liq. 2377
  - stilbene, α-excited, spatial delay 3171
    - decay time meas. 8332
  - tri-α-naphthylborine, thermal neutron detect. appl. 4158
  - wavelength dependence in X-ray region 5968
  - sensitized phos. of liquids 6647
  - u.v. excited aryl subst. pyrazolines, halogen subst. triphenylpyrazoline, DHC, quantum yield 6652
  - diphenylacetylene, decay time meas. 8332

Luminescence spectra see also *Spectra, resonance*
- benzotrifluoride, rel. to absorpt. spectrum 149
- *meta*-xylene, rel. to absorpt. spectrum 150
- formaldehyde, near u.v. 152
- rubies, red fluorescence 1514
- assoc. dyes, Franck–Condon principle appl. 1523
- AgI sublimate phosphor 1540
- BaO, cathodoluminescent, rel. to thermionic activity 1548
- ZnS phosphors, absorpt. and emiss. 3158
- organic phosphors, X-rays and cathode rays 3163
- liquids, modified Beckman DU spectrophotometer meas. 4724
- aryl substit. pyrazolines, halogen subst. triphenylpyrazoline, DHC, u.v. excited 6652

Luminosity see *Stars, magnitudes*

Magnesia
- scattering of polarized light 4045

Magnesium
- u.s. waves velocity 1448
- electrodes, vac. spark emission charac. 3096
- thermal cond., low temp., mag. field 6698

Magnesium chloride
- surrounding seawater drop nuclei 7355*

Magnesium ferrite
- spontaneous magnetization 958
- microwave dielec. const. and permeability 4079
- dielectric behaviour 4080, 7661
- magnetic spectrum, resonances 4212, 8535

Magnesium ferrite—*contd.*
  neutron diffraction study 6134
  Mg–Zn ferrite, spontaneous magnetization, temp. var. 8578
  ferromag. Faraday rotation, microwave 8598
Magnesium oxide see also *Magnesia*
  field emission, mechanism 904, 7725
  diffuse reflectance, near i.r. 2362
  index of refraction 3090
  high temp. elec. conductivity 4798
  neutron bombard. effect on susceptibility 6956
  irradiation-induced photoconductivity 7682
  crystalline, secondary emission 7724
  elec. conductivity and thermoelec. power 8411
Magnesium sulphate
  water solutions, u.s. dispersion 5914
  solutions, u.s. absorption 5919
Magnesium titanate
  heat capacity and entropy 3268
  elec. conductivity 6771
Magnetic field measurement
  rotating coil fluxmeter 313
  mapping of sun's mag. fields 3804
  nuclear mag. reson. method 4900, 5563
  along electron lens axis, electrodyn. meas. 5562
Magnetic fields
  ring shims for coned polecaps 316
  potential theory problems, digital computer recording heads appl. 955
  due to rotation, Schuster–Wilson hypothesis test 2531
  intensity definition criticism 2555
  origin in moving plasma, astronom. appl. 3324
  magnetic dipole source in dissipative medium 3446
  rel. to current in superconductor 4106
  of finite solenoid, calc. 6129
  2-dimens., above and below inf. corrug. sheet 6745
  mag. impulses influence on electron kinetic energy 6835
  mass spectrometer, control and stabilization 6867
  due to magnetized ellipsoids of revolution 6935
  old and new definition 6936
  motion of conducting sphere, uniform field 7787
  small solenoids for intense field prod. 7790
  generated in electric discharges 8428
  generated in circulating liq. Hg 8429
  powerful and uniform, Helmholtz coil production 8582
Magnetic hysteresis
  loops in Fe transformations, interpret. 1579
  influence on demagnetization temp. scale 1589
  spheroidal inclusions, effect on coercive force 1744
  ferromag., internal friction from magnetization rotation 1755
  grain size influence on coercive force 1757
  coercive force and magnetocrystall. energy 1758
  loop change of shape with magnetic creep 6143
  Jordan constant rel. to initial permeability 6145
  resonance phenomena in ferrites 8570
  Richter type after-effect in ferrites 8571
Magnetic measurements see also *Magnetic field measurement; Terrestrial magnetism*
  permeability, of rod specimens 312
    hyperfrequency region 5460
    tensor in ferrites 8548
  recording a.c. Hall effect apparatus 340
  susceptibility, and adsorption isotherms simult. meas. 948
    weak fields, vibrating reed microbalance 3419
    low-temp., cryostat 6006
    Helmholtz coils for 8582
  Barkhausen reversals in ferromag. specimens 1745
  magnetometer suitable for remanent magnetism meas. 2531
  magnetostriction, in single crystals 2578
    review 3472
  microwave magnetometer (Faraday rotation) 3420
  flux, Ge Hall effect probes 3470
  apparatus for deep-sea measurements 4492
  retentivity, ballistic method 6147
  a.c. energy losses in Fe at mag. saturation 6957
  field gradients by nuclear induction meth. 7786
  gyromag. ratios, rotation-by-magnetization method 8577
  spontaneous magnetization temp. var. 8578
Magnetic properties of substances see also *Crys properties, magnetic*
  de Haas–van Alphen effect, enriched Sn isotopes 33
    number theory appl. 949–50
    Pb, at high fields 974
    interpretation 1753
    electron gas considerations 2551
    charac. of large electron systems, calc. 8511
  triangular Ising lattice, spontaneous magnetizati 328
  Pd–Rh alloys susceptibilities, 20°–300°K 956
  compds. of Th and heavier elements, review 1035
  soil, magnetic susceptibility 1272
  MnO heat capac. anomaly interpret. 1592
  grain size influence on coercivity 1757
  ferrocene susceptibility, electron struct. interpr 1818
  polycrystall. graphite, anisotropic susceptibility 25
  cerium ethyl sulphate, theory 2545
  high temp. susceptibility, permanent dipole lattic 3428
  Ce salts, interatomic elec. quadrupole-quadrupo coupling calc. 3502
  metals, effect of gases 3636
  12 α-amino-acids, susceptibilities 3704
  Mn transformation studies 4056
  new materials, review 4204
  coercive field of mag. matls., theory 4218
  coloured KCl crystals, susceptibility excess 4903
  $CoCl_2$ and its solid solutions 5565
  rel. to electron distribution, alloys and compoun 7791
  W, Mo, Nb, V, Cr, Mn, Fe, neutron diffract. stud 8525
  Gd, Dy, Er, Curie temp. and magnetization curv 8554
 diamagnetic
  polyacenes, anisotropy 326
  H_2 molecule susceptibility 369
  anisotropy of 4-ring condensed aromatic hyd carbons 1754
  Bi, electron gas susceptibility, electron mass eff 2551
  metals, cylindrical system of electrons 3421
    Landau diamagnetism surface corrections and Haas–van Alphen effect 8511
  ozone, no appreciable paramag. 5644
  corundum, susceptibilities of some forms 6954
  neutron bombard. effect on pure oxide susceptibili 6956
  gas susceptibilities, h.p. effect., rel. to dielec. chan 7662
  anisotropy of *p*-dibromobenzene, *p*-benzoquino naphthalene, bibenzyl, stilbene, azobenzene, , low temp. 7798
  graphite, effect of Br, theory 8513
  rel. to atomic arrangements in crystals, review 87
 ferromagnetic
  FeS_n, Yosida's theory 317
  Gd–Mg alloys 318
  CrTe, neg. interact. between atoms on differ lattice sites 319
  Permalloy, new gyromagnetic effect 329
    Cr–Permalloy, magnetic after-effect 4200
    explanation of props. 8529
    crystal, uniaxial anisotropy 8530
  Fe, new gyromagnetic effect 329
    high-purity, dissolved O effect in a.c. fields 253
    a.c. energy losses at mag. saturation 6957
    pyrophoric powders 7320
    fine particles, coercive force 8543
    ferromag. reson. 8553
  binary alloys, satn. magnetization 954
  ferrites, mag. spectrum temp. dependence 959
    and pyrrhotite, ferrimagnetism 1746
    g factor 1747
    magnetic, and Cd ferrite, solid solns. magneti tion and microwave absorpt. 4206
    magnetite, microwave reson. absorpt. 4208
    exchange freq. electron spin resonance 4905
    magnetite powders, interpretation 4906
    high permeability cores, a.c. losses 6130
    complex permeability core 6144

- **Magnetic properties of substances**—*contd.*
  - **ferromagnetic**—*contd.*
    - ferrites—*contd.*
      - dynamic magneto-elastic constants det. 7811
      - low-temp. transformation 8533–4
      - magnetic spectra 8535
      - Ferroxdure, domain walls 8547
      - permeability tensor, meas. 8548
      - resonance phenomena 8570
      - crystals, domain wall motion 8575
      - BaO . $6Fe_2O_3$, saturation magnetization at 0°K 8542
      - Cd, solid solns., magnetization and microwave absorpt. 4206
      - Co, magnetostriction rel. to composition 341
      - Co, magnetostriction thermal var. 342
      - Co, spontaneous magnetization 958
      - Co, anomalous reson. absorpt. 4211
      - Co–Zn, anomalous reson. absorpt. 4211
      - Co–Zn, ferromag. reson. 4214
      - Cu, spontaneous magnetization 958
      - Cu, ferromag. reson. 4212
      - Fe, spontaneous magnetization 958
      - Fe and Co mixed oxides, elementary magnetization mechanisms 8574
      - Fe_5CuO_8 struct. and props. 2541
      - Mg, spontaneous magnetization 958, 8578
      - Mg, ferromag. reson. 4212
      - Mg, Faraday rotation, microwave 8598
      - Mn, ferromag. reson. 4212
      - Mn–Zn, ferromag. reson. 4214
      - Mn–Zn, Richter type after-effect 8571
      - Ni, spontaneous magnetization 958
      - Ni, Hall effect 988
      - Ni, neutron diffraction study 8526
      - Ni–Cd, solid solns., magnetization and microwave absorpt. 4206
      - Ni–Zn, spontaneous magnetization 958
      - Ni–Zn, ferromag. reson. 4212
      - Ni–Zn, magnetic viscosity 5575
      - Ni–Zn h.f. dispersion 8536
      - Ni–Zn, Richter type after-effect 8571
      - Ni–Zn, Faraday rotation, microwave 8598
      - Zn, neutron diffraction study 8526
    - Fe oxide, hexagonal compds. with and without preferred orientation 961–2
      - powders, interpretation 4906
      - Fe_2O_3 (rhombohedral), ferro- and antiferromag. results 8532
    - igneous rocks, reverse thermo-remanent magnetism 963–4
    - magnetic recording tapes, anisotropy 965
      - properties reqd. 8581
    - Ni, magnetostrictive and ΔE effects 989
      - coercivity rel. to magnetocrystall. energy 1758
      - magnetization temp. dependence 1759
      - collective electron theory 3426
      - initial magnetization under tension 3439
      - sheets, effects of working 4216
      - ferromag. reson., energy absorpt. 6133
      - coercive force, fine particles 8543
      - films 8544
      - single crystal, Bitter figures 8550
      - ferromagnetic resonance 8553
    - pyrrhotite, ferrimagnetism 1746
    - Perminvar wire, a.c. magnetization charac. 1763
    - Carr's model of susceptibility temp. var. 2536
    - Ni–Cu, spectroscopic g factors 2540
      - collective electron theory 3426
      - spont. magnetization 6960, 8578
    - nonsaturated, microwave permeability tensor and Faraday effect 2577
    - Co, collective electron theory 3426
      - coercive force, fine particles 8543
    - Ni–Co, collective electron theory 3426
      - magnetization curves 4213
    - C steel coercive force, Néel's theory 3429
    - neutron diffraction invest., review 3626
    - dilute ferromagnetics, approach to saturation 4215
    - Dy, metallic 4904, 7792
      - expansion anomalies 7624
    - LiFeCr spinels, spont. mag. reversal, temp. rel. 4908
      - anomalous g factor temp. rel. 4909

- **Magnetic properties of substances**—*contd.*
  - **ferromagnetic**—*contd.*
    - Co–Pt alloys, permanent mag. props. 4918
    - Cr–Te alloys, resonance 5566
    - Fe–Ni alloys, mag. viscosity temp. dependence 5577
    - soils, susceptibility rel. to rocks from which derived 5792
    - Supermalloy, ferromag. reson., energy absorpt. 6133
    - initial permeability rel. to Jordan hysteresis const. 6145
    - antiferromagnetism, review 6932
      - ferro- and antiferromag. Fe group substances, magnetic distances 957
      - antiferromagnet parallel susc., low temp. 960
      - Cr_2O_3, anomalous sp. ht. at antiferromag. Curie temp. 1593
      - MnO, resonance above Curie temp. 1748
      - $CuCl_2 . 2H_2O$, crystal, susceptibilities 2538
      - haematite, rel. to cryst. struct. 2825
      - reson. absorpt. in $CuCl_2 . 2H_2O$ 3423
      - susceptibility spin wave theory 3424
      - Mn and Co mixed oxides 4907
      - $CuCl_2$ crystal, spont. magnetiz. 6939
      - Fe_2O_3 (rhombohedral) and Fe_7S_8, ferro- and antiferromag. results 8532
      - $CuCl_2 . 2H_2O$ crystals 8540
      - Cr_2O_3, MnO, MnTe, MnSe, MnS, CoO, VO_2, NiO, CuO, antiferromag. reson. 8541
    - V_2O_5, near transformation temp. 6951
    - Ni–Fe, reverse magnetization nuclei in wires 6958
      - Barkhausen noise 8531
    - Gd, Dy, thermal expansion anomalies 7624
    - special mag. matls., temp. sensitivity, survey 7793
    - magnetization curve analysis 8520
    - precipitation alloys, coercive force study 8545
    - Fe-group fluorides, magnetic anisotropy 8546
    - Si–Fe, poly- and single crystal powder patterns 8549
    - Mn compds., microwave reson. absorpt. 8551
      - Mn_2Sb, Mn_4N, Mn_2As, MnP, neg. interact. betw. atoms on different lattice sites 319
      - powdered MnBi use in permanent magnet 320
      - Mn and Co mixed oxides, antiferromagnetism 4907
      - MnO, MnTe, MnSe, MnS, antiferromag. reson. 8541
    - recent developments survey 8552
    - Mishima alloys (Alnico 5), magnetic structure 8556
    - ferrimagnetic matl. magnetization, thermal effects 8579
    - rel. to atomic arrangements in crysts., review 8769
  - **paramagnetic**
    - Yosida's theory of FeS_n 317
    - V_2O_4 thermomag. curve, 81°–680°K 321
    - Pd–Re system 322
    - $CuSO_4 . 5H_2O$, anomalous 324
    - ferric acetate and benzoate, susceptibilities down to 2°K 966–7
    - chrome alums, crystalline field theory 969
      - low temps., Cr^{+++} props. 971
      - low temp. 1573
      - adiabatic demag. and temp. scale 1589
    - phototropic substances 973
    - uranyl-like ions 2532
    - $C_{18}H_{21}N_2O_2$ free radical, susceptibility 2543
    - purple S, prelim. study 3433
    - suscept. of NO and O in clathrate cpds. 3438
    - Pd–Ag alloys 4064
    - paramag. scatt. of neutrons by Mn^{++} 4395
    - $MnCl_2 . 4H_2O$, mag. saturation and app. molec. fields 4915
    - antiferromag. struct. in Cr_2O_3 6136
    - rare earth salts, theory 6931, 6950, 7630–1, 7797, 8385, 8562
    - $Nd(C_2H_5SO_4)_3$, $Ce_2Mg_3(NO_3)_{12}$, $CuCs_2(SO_4)_2$, entropy/susceptibility rel. 6931
    - $CH_3NH_3 . Cr(SO_4)_2 . 12H_2O$, adiabatic demagnetization 6949
    - (U, Th)O_2 solid solutions 6953
    - $Ce_2Mg_3(NO_3)_{12}$, mag. props. theory, sp. ht. rel., 1°–4·2°K 7630
      - entropy/susceptibility rel. 6931
      - magnetic temp./abs. temp. rel. below 1°K 7631
    - neutron scattering invest. Pr_2O_3, Nd_2O_3, Er_2O_3 8527
    - V, Nb, Ta, W, Mo, high temp. susceptibility 8558

A complete list of the Subject Headings will be found at the end of the Index.

Magnetic properties of substances—*contd.*
  paramagnetic—*contd.*
    Cu acetate, anomalous paramagnetism 8559
    Cr, Fe, Gd, Cu salts, low temp. magnetization studies 8560
    3 Fe ions in 2 org. molecules, exchange coupling 8561
    resonance, review 8566
    CoO, antiferromagnet, magnetomech. effects 8569
    rel. to atomic arrangements in crysts., review 8769
Magnetic relaxation
  Cr alums, low temp. 1573
  in CrK alum 2542
  rel. to paramag. absorpt. and nuclear induction, review 5385
  processes, in ferromagnetism 8537
  in ferromagnetic resonance 8538
  rotational, in Ni, at h.f. 8601
  nuclear, in crystall. solids 8771
Magnetic storms
  and aurorae, theories 1274
    auroral H-lines, Döppler displacement, appl. 4518
  geographical distrib. of field 2838
  semi-local disturbances 4493
  and solar corona, bright "*c*-regions" occurrence rel. 4494
    correlation with monochromatic corona 7340
  effect on ionosphere, obs. and theory 7350
    rel. to *F*2-region ionospheric storms 2098
    effect on *F*2 layer perturbations 7351
  radiowave echo observations 8814
Magnetism see also *Diamagnetism; Ferromagnetism; Gyromagnetic effect; Paramagnetism; Stars, magnetism; Terrestrial magnetism*
  quantum theory of matter (book) 26
  exchange coupling and Curie–Weiss law 314
  electron gas magnetic props., number theory appl. 949–50
  mag. moments coupling, molecules with 3 Fe atoms 966–7
  Nat. Bur. Stand. units, dissemination 1737
  dipole flux distrib., rel. to Barkhausen discontinuities 1745
  remanent, magnetometer suitable for meas. 2531
  as phenomenon of current electricity 2555
  magneto-hydrodynamics, wave propagation 2561
    isotropic turbulence eq. 2232
    compressible medium, turbulence 2992
    shock waves 3799
    oscillations of star 3829
    generalized formulae 4919
    longitudinal waves, props. 5339
    shock waves in plasma 8583
  cylindrical system of electrons, mag. behaviour 3421
  fluid motion in pipes under mag. field 4220
  ideal plasma, eq. of motion 4222
  definition of several mag. quantities 5561
  low temp. phenomena (book) 8366
Magnetite
  transformations rel. to elec. cond. changes 3297
  microwave resonance absorption 4208
  powders, interpretation of magnetic props. 4906
  low temp. transformation, magnetic study 8533–4
Magnetization see also *Demagnetization*
  de Haas–van Alphen effect, enriched Sn isotopes 327
    number theory appl. 949–50
    at high fields 974
    interpretation 1753
    electron gas considerations 2551
    with large electron systems 8511
  spontaneous, of triangular Ising lattice 328
    of ferrites 958
    ferromag. internal friction due to rotation 1755
    of 2-dimens. rectangular Ising model 3427
    reversal rel. to temp. in LiFeCr spinels 4908
    $CuCl_2$ single crystal 6939
    Cu–Ni alloy, temp.-var. 6960
    temp. var. meas. 8578
  saturation, of binary ferromag. alloys 954
    approach in dil. ferromagnetics 4215
    of Ni, at high press. 5237
    of Gd metal 6959
    $BaO.6Fe_2O_3$ at 0°K, antiferromag. interpret. 8542
Magnetization—*contd.*
  Ferroxdure charac. 961–2
    domain walls 8547
  reverse thermo-remanent magnetism in rocks 963
  Barkhausen effect, detection of small reversals 17
    statist. study 1760–2
    and initial permeability, mag. after-effects 4916
    noise, in Ni–Fe alloys 8531
  Ni_3Fe internal friction 1756
  Ni, in low fields, temp. var. 1759
  Perminvar wire, a.c. charac. 1763
    internal friction 1765
  Si–Fe crystals, domain struct. near cavities 1764
  Permalloy, internal friction 1765
    magnetic crystal anisotropy invest. 8529
    uniaxial anisotropy 8530
  toroids with one and two cuts 1766
  initial, of Ni under tension 3439
  reverse magnetization, domains 3440
    nuclei 6958
  and magnetostriction, review 3472
  ferromagnetic after-effect mech. 4200
  domain theory, new matls. appl. 4204
  magnetic ferrite and Cd ferrite solid solns. 4206
  Ni–Co alloys 4213
  coercive field, magnetic matls., theory 4218
  preferred direction in mag. hardened alloy 4219
  $MnCl_3 . 4H_2O$, magnetic saturation and appare molec. fields 4915
  Co–Pt alloys, permanent mag. props. 4918
  relationships between loss values and coercive for 5572
  heterogeneous materials in strong fields 5573
  plastic deformed Fe in strong fields 5574
  magnetic viscosity, Ni–Zn ferrites 5575
    as function of body, not substance 5576
    temp. dependence, Fe–Ni alloys 5577
  Fe single cryst., domain structure 6961
  analysis of curves 6981
    review 8520
  noise in cyclic mag. reversal 7788
  new results on ferro- and antiferromagnetism 8532
  low temp. transformation, in magnetite 8533–4
  powder pattern comparison, poly- and single crysta 8549
  figures in Ni single crystal 8550
  curves, Gd, Dy, Er 8554
  Cr^{+++}, Fe^{+++}, Gd^{+++}, Cu^{++}, low temp., stron field 8560
  Si–Fe, heat effects 8573
  mixed oxides Fe and Co, elementary mechanism 8574
  domain wall motion, ferrite crystals 8575
  theory, magnetic energy formulae rel. 8576
  ferrimagnetic matl., thermal effects accompanyin 8579
  thermoremanent, of fine powders 8580
  Fe oxides for magnetic recording 8581
  dilute alloys, effect on elec. resist. 8609
Magnetochemistry see also *Chemical structure, magnet effects*
  susceptibility and peroxide structures 522
  susceptibilities of 12 α-amino-acids 3704
  o-, *m*- and *p*-nitroanilines, susceptibilities rel. t struct. 7261
Magnetoelectric effects see also *Hall effect*
  resist. changes in mag. field, mechanism 213
    in semiconductors 985, 3303
    in Fe film 3318
    metals, low temps. 3319
    in InSb 4816
    in Fe_3Pt 7689
    in dilute alloys 8609
  galvanomagnetic effects, Onsager's rel. appl. 836
    in semiconductors 985
    review 7675
  conductors, mag. absorption losses 984
  Fe single crystal, magneto-thermoelec. power, lo temp. 1650
  electrodynamic potl. theory 4083
  photo-magneto-electric effect, Ge 4812
  supercond. film in mag. field 5474

Magnetomechanical effects see also *Gyromagnetic effect; Magnetostriction*
- ΔE and magnetostrictive effects in Ni 989
- internal strain, effect on H_c temp. var. 1758
- Perminvar wire under tension, a.c. magnetization charac. 1763
- turbulence damping by field 2991
- magneto-elastic effects, metals, review 3674
- mag. field effect on viscous flow stability 3905
- Ni, saturation magnetization at high press. 4237
  - ΔE effect and decrement, h.f. 8601
- magnetization curve plastically deformed Fe 5574
- in an antiferromagnet, CoO 8569
- u.s. attenuation, magnetic single crystals 8602
- Si–Fe domain pattern under stress 8604

Magneto-optical effects see also *Chemical structure, magneto-optical effects; Zeeman effect*
- double refraction at microwave frequencies 339
- mag. measurements on phototropic substances 973
- Faraday effect, in D, O, He and some vapours 1792
  - photoelec. meas. 2576
  - in nonsat. ferromag. matls., theory 2577
  - microwave, magnetometer 3420
  - in conductors and semiconductors 5598
  - microwave, appl. 8598
- magnetophotophoresis, research 1796, 8605
  - in powdered silver steel 8606
- rotatory dispersion and Cotton effect 4025
- rotatory power, rel. to temp. and phys. state in CS_2 4937
  - Kr and Xe 7809
  - Co III triethylene diamine 7810
- phosphite ions, consts. det. 5597
- rel. to paramag. resonance 8597

Magnetostriction
- Co ferrites, rel. to composition 341
  - thermal var. 342
  - and Ni ferrite single crystals 1795
- magnetostrictive and ΔE effects in Ni 989
- piezomagnetic nomenclature proposal 990
- theory, substitution for electrostriction theory 1626
- in Permalloy, and Perminvar 1765
- rel. to cooling rate 8529
  - uniaxial anisotropy 8530
- meas. in single crystals 2578
- Fe–Ni alloys, mag. crystal anisotropy 2579
- of some ferromagnetic alloys 3471
- review 3472
- Fe constants temp. dependence 4236
- approach to saturation of even effects 5602
- theory, strong field 5603
- partial changes in ferromag. media 6157
- extensional and torsional vibr. excitation in ferrites 7811
- Fe and Co mixed oxides 8574
  - X-ray det. 8603
- theory, magnetic energy formulae rel. 8576

Magnetothermal effects
- V_2O_4 thermomagnetic curve, 81°–680°K 321
- in metals, Onsager's rel. appl. 836
- in semiconductor study 985
  - applicability of classical statist. 3304
- Ni magnetization temp. var. 1759
- electrodynamic potl. theory 4083
- mag. field effect on thermal conductivity, metals 4758
- Fe_3Pt 5604
- mag. field influence on polymorphic transformations 5605
- metals, at low temperatures 6698
- Bi–Pb alloys, Ettingshausen effect 6807
- thermal cond. in mag. field, review 7675
- special mag. matls., temp. sensitivity, survey 7793
- Fe_2O_3, haematite 7794
- in relation to magnetization curve anal. 8520
- Fe_2O_3 (rhombohedral) and Fe_7S_8, thermomag. props. 8532
- in magnetization, of Si–Fe 8573
  - of ferrimagnetic matl. 8579

Magnetrons see *Electron tubes*

Magnets
- ring shims for coned polecaps 316
- permanent, from powdered Mn bismuthide 320
- magnetic recording head design, potential theory 955

Magnets—*contd.*
- toroids with one and two cuts, magnetization 1766
- relativistic electrodynamics 2554
- recent developments survey 8552

Manganese
- thermionic constants 937, 2516
- transformations, magnetometric studies 4056
- MnS, microwave reson. absorpt. 4207
- paramag. reson. absorpt. 5568
- fluosilicate, deviations from Brillouin's free-spin theory 6309
- thermal cond., low temp., mag. field 6698
- coeff. of cathode disint. in elect. arc 7696
- magnetic structure, neutron diffraction study 8525
- MnTe, MnSe, MnS, antiferromag. reson. 8541
- MnAs, MnSb, MnBi, ferromag. reson. absorpt. 8551
- diluted salts, fine and hyper-fine paramag. reson. struct. 8567

Manganese bismuthide
- powdered, use for permanent magnet 320
- ferromagnetic resonance absorption 8551

Manganese chloride
- $MnCl_2 . 4H_2O$, mag. saturation and apparent molec. fields 4915

Manganese ferrite
- *g* factor 1747
- microwave dielec. const. and permeability 4079
- ferromag. resonance 4212
- Mn–Zn ferrite, ferromag. reson. 4214
  - Richter type after-effect 8571

Manganese fluoride
- MnF_2, neutron diffraction antiferromag. study 6132

Manganese oxides
- MnO_2 catalytic and depolarizing props. invest. 1218
- MnO, heat capacity anomaly 1592
  - microwave reson. absorpt. 4207
  - antiferromag. reson. 8541

Manganese selenide
- microwave reson. absorpt. 4207
- antiferromagnetic resonance 8541

Manometers see also *Barometers; Vacuum gauges*
- recording Hg, for 0–760 mm 2982
- elec., for press. up to 40 mm Hg 3895
- Hg, absolute, performance conditions 5870
- quartz fibre, theory 6509
- diaphragm micromanometer 7505
- differential, recording, for reaction kinetics meas. 8251
- simple U-tube micromanometer 8252

Mass spectra see also *Chemical analysis, positive rays*
- methyl siloxanes, ionization and dissoc. invest. 3389
- aliphatic amines 3392
- tetramethyl cpds. of C, Si, Ge, Sn, Pb 3393
- empirical, of elementary particles 4383
- doublets at 28 and 30, r.f. meas. 5666
- Rh^{102} and Rh^{104} 7053

Mass spectrometers see also *Ion beams, focusing*
- r.f., for upper air research 558
  - linear, analysis 3366
- with magnetic sectors, aberrations 1687
- double-focusing, high resolution 3367
- theory and appl. (book) 4152
- combined field giving axial, radial and vel. focusing 4867–8
- 2nd-order focusing in wedge-shaped mag. field 4869
- with anastigmatic image 4870
- angular aberration correction 5526
- precision, comparison of existing app. 6093
- impulse type, short-lived isotopes 6094
- resolving power formulae 6861
- method of determining dispersion 6864
- pulsed, with time dispersion 8457
- special contact transformations, realization 8458
- **accessories** see also *Ion sources*
  - vacuum lock for routine solid analyses 3019
  - needle valve variable gas leak 6865
  - magnetic field control and stabilization 6867
- **applications** see also *Chemical analysis, positive rays*
  - Eu and Sm isotopic constitution time var., half-lives det. 395
  - magnetic lens spectrom., light nuclear reactions radiations study 1112
  - nuclear reaction energies, precise det. 3589

Mass spectrometers—*contd.*
- **applications**—*contd.*
  - *m/e* direct comparison for positron and electron 4070
  - in physics, chem., engineering, biochem., geology (book) 4152
  - methyl radicals combination rate 4442, 8008
  - ionization of H_2O_2 4886
  - O_4 present in O_3 invest. 4942
  - isotopic abundances meas., residual peaks present 4970
  - Kr^{85} half-life det. 4984
  - group IVB elements, molec. evap. 5524
  - impulse type, Li, Na and K absolute mass meas. 6094
  - Pb isotope analysis, minerals 6188
  - age determinations by potassium-argon method 6327
  - diffusion pump oil study 6538
  - ionic emission study, alumino-silicates 6911
  - Si, Ge, Hf isotopic constitutions, meas. 7059
  - atom and free radical detect., flames 7629
  - fast-scanning spectroscope in kinetic studies 8009

Mass standards
- load meas. devices calibration 2977
- primary load standard 2978

Mathematics
- number theory, electron gas mag. props. appl. 949–50
- advanced, in physics and engineering (book) 6372

Matrices see also *Quantum theory*, S-*matrix*
- Mathieu–Hill type eq., matrix solution 6373
- algorithm of Dirac spurs 7442
- infinite, assoc. with diffraction by aperture 8296

Measurement see also *Instruments; Recording; Standards; Units; Acoustical measurements; Electrical measurements; Magnetic measurements; Mechanical measurements; Thermal measurements; Radioactivity measurement; X-ray measurement.* Some specific quantities are listed separately, e.g. *Calorimetry; Density measurement*
- association between measurements, statistics (book) 4579
- mechanical multipliers for indirect meas. 7412
- meaning of concept 7463
- metrology and classification of meas. app. 7477
- **errors** see also *Errors; Statistical analysis*
  - systematic, in sound vel. indirect meas. 703
  - angular meas., geodesy, elimination 1354
  - reflectometers, using photometric sphere 1480
  - in impulse analysis by resonators 1771
  - cathode-ray oscillograph, precision calibration 2922
  - in automatic particle counting and sizing 3896
  - in spectrophotometric colorimetry, propagation 5988
  - centring errors, effect on sector disk transmission 6590
  - fluctuation theory, review 8199
  - sampling, in thermopile radn. meas. 8380

Mechanical measurements Individual quantities and instruments are listed separately, e.g. *Length measurement*
- steel surface roughness 1162
- automatic particle-sizing by counting 2225
- straightness of microscope stage 2974
- mech. impedance of gramophone pick-ups 3036
- device for position location 3893
- height, small particles, etc., shadow microscopy 4049
- comparator for small level differences 5314
- liquid levels, by bob suspended from drum 5713
- single crystal extensometer 7217
- wave-height analyser 8258

Mechanical strength see also *Breaking strength; Elasticity; Hardness*
- CdO sputtered layer 224
- linear polymers, orientation effect 492, 7998
- Fe yielding, Cottrell–Bilby theory modfn. 1983
  - initial yield 2769
- glass, resistance to rupture 1987*
- Zn, yield point rel. to dissolved N 1989
  - crystals, bending, yield points 1988
- metals, effect of gases 3636
  - effect of high pressure 5740
- cohesive layers, compression and bearing capacity 3661
- tensile testing machine, const. temp. and strain rate 3666

Mechanical strength—*contd.*
- tensile specimen prod. by electro-turning 3667
- effect of surface conditions 4400
- fatigue tests statistical interpret. 4425
- metal fatigue, struct. changes 4426
- transient stress-wave particle velocities, engraveme 4431
- high-speed rotor design 4627
- phys. chem. textbook 5148
- influence of cracks on mech. props. 5738
- dynamic, of plastic matls., meas. 6274
- polycrystal, effect of crystall. struct. 6275
- liquid N 7479
- yield points in brass crystals 7993

Mechanics see also *Dynamics; Statistical mechanics*
- relativistic, impulse and mass relationships 21
- moment of inertia, numerical series sum metho 2213
- alternative formulation of laws 2968
- of rubber, tube expts. 3645
- statics problems, routine analytic method 3888
- tension in strings round cylinders 7475

Medical science see also *Hygiene; Physiology; Radi therapy*
- electrocardiographic problem, solution 825
- i.r. absorpt. techniques in hypersensitivity diseas study 1318
- ultrasound as therapeutic agent 2275–6
- pharmacological research, radioactive tracers app 5053

Melting
- rel. to thermal wave propag. 180
- solid-liquid critical point 183
- Al, quartz, in centrifugal solar furnace 184
- elec. conductivity changes in metals 838
- change of vol., rel. to transformation press. 1578
- curve, corresponding states appl. 2238
- press. curve det., blocked capillary method 2412
- metals, entropy rel. to disorder 3003
- statistical theory 4055
- alkali halides, condition for instability 4471
- as order-disorder transition 4779
- under pressure, below m. pt., thermodynamics 54
- crystalline polymers, rotational-isomerism theo 5764
- solid helium 6725

Melting point
- BaF_2, CaF_2, compared 489
- Teflon tetrafluoroethylene resin, effect of press. 81
- crystallite liquid theory formula 1420
- transition metals, regularities 1580
- rel. to friction stick-slip lengths 2774
- Polythene, effect of cross-linking 4455
  - rel. to molar volume 7260
- UF_6 4634
- new apparatus for determination 5999
- solid He 6725
- metals at v. high press., det. 8358

Membranes
- kation exchange, elec. conductivity 6288
- membrane accumulator 6292
- membrane apparatus for analogic expts. 6381

Mercury
- low abundance in meteorites 10
- liquid, self-diffusion 64
- h.p. arc as spectral source, self-absorption 131
- vapour in discharge lamp 176
  - green continuum enhancement by rare gas 1665
  - arc discharge mech. 4117–19
  - pos. columns, voltage gradient 4823
- Hg_2 dissociation energy 352
- cathode spots on Hg pools, current density 870
- rarefied, de-ionization process 936
- $Hg(^3P_7)$ reaction with ethylene 1210
- transition region superconductivity meas. 1646
- excited, photoionization 3529
- limiting neg. press. in glass 3913
- surface tension, sessile drop method 3914
- thermal resistivity in super-cond. intermed. sta 6062, 8426
- afterglows, processes involving ions and metastab atoms 6067

Meson field theory see *Field theory, meson field*

A complete list of the Subject Headings will be found at the end of the Index.

esons see also *Cosmic rays, mesons; Fundamental particles*
  meson current round nucleon 46
  V-particles, possible models 462–3
    and τ-mesons, theory 464
    composite nature? 465
    neutral cloud chamber study 1944
    fragment containing V^0, probable emission 3616
    V^0 as nucleon excited state 3860
    model, and meson-nucleon scatt. 4379
    V^0 due to 450 MeV protons, search 4389
    heavy, positive, evidence 5104
  τ-meson, observation 1145
    and V-particles theory 464
    new example 2734
    nature of 8702
  ensemble bounded by source interact., thermodynamics 2185
  convergent meson theory 2196
  S-matrix method in pion reactions 2955
  1st-order wave eq. 2961
  slow κ, in cosmic-ray stars 5560
  $2p$–$1s$ transition in capture by C 5694
  ditto. C, O, Be 1020
  ang. distrib. of photomesons 5703
  non-linear mesodynamics 6471
  pion zero-point energy and Fermi's nucleon collision theory 7169
  K mesons, mass and other data 7173
  in conformal relativity 7414
  summary of exptl. facts (book) 7948
  cosmic ray, unstable, review 8488
absorption
  cosmic ray, in NaI crystals 947
  photometric track meas. in emulsions 1928
  mesonic Auger effect 1945
  into atomic levels, electron prod. 3567
  π-mesons, capture process by deuterons 3619
    37 MeV, total cross-sections in H 6235
    by nuclei, optical model 8498
    positive, by Al 7958
    37 MeV pos. in Pb, nuclear cross-section 1149
    negative, brought to rest in Pb, Sn, Al, C, neutron emission 470
    slow neg. by He^4 nuclei 6237
  μ-mesons, nuclear capture 4339
    of short range, observation 1144
    4 MeV, straggling parameter in photo. plate 4381
    fast, energy range rel., rock 1726
    neg., capture in emulsions 8696
    neg., from cyclotron, in emulsions 8697
decay
  μ-mesons, energy spectrum of positrons 472
    neg., in Li, Be, C, lifetimes 1936
    negative 2954
    pos. and neg. lifetime 4382
    inner bremsstrahlung 6238
    stopped in C 7949
    electron energy spectrum est. 7953
    neg., stopped in Fe, mean life 7959
    γ-radiation 8695
    pos., decay momentum 8700
  the V-particle and the composite pion 1151
  τ-mesons, in flight 1932
    theory 7179
    analysis 8702
  charged V-particles 1931
    decay products, transverse mom. spectrum 1150
    mean lifetime 1930, 4384
  neutral V-particles 1943
    mean life 3611
    delayed disintegration, in nuclear fragment 5716–17
    2- and 3-body decay 5720
    unusual example 7172
    into 2 mesons 7177
    multiplate cloud chamber obs. 7178
  π–μ, γ-radiation emitted 2737–8
    μ-meson range distrib. 4381
    short μ-meson tracks 468
    unusual decays in emulsions 7174
  mean life-times, statistical estimation 4385

Mesons—*contd.*
decay—*contd.*
  π-meson 5099
    pos. and neg., lifetimes 471
    low-altitude electron prod. 941
    π^0, alternate modes, internal pair creation of γ-rays 2740
  heavy mesons and V-particles, mean lifetimes 5108
  fast mesons, electrons produced 5714
  cosmic ray, unstable review 8488
detection
  high-energy, organic phosphors appl. 930
  scintillation counter appl. (book) 6884
  117 and 222 MeV π-meson tracks, grain density 8170
effects see also *Nuclear reactions, mesons*
  X-rays from $2p$–$1s$ transitions of captured π-mesons 1020
  ditto, μ-mesons 5694
  nucleon/μ-meson interaction coupling const. 1937
  μ^--mesons, interaction with U 4341
    slow, nuclear disintegrations 2685
    capture by Pb, γ-ray production 3562
  μ-mesons, pairs, knock-on electrons, etc. 4388
  ionizing capac. meas. with mag. spectrometer 6898
  ionization in argon 6912
  knock-on electrons produced in lead 7166
  μ-meson knock-on electrons underground 7753
  π^--mesons, nuclear excitation 7908
    electron pair production 7909
    on deuterons, γ-quanta and neutral mesons prod. 3612–13
    210 MeV, nuclear interactions in emulsions 5109
mass
  μ, π, V_2, τ, κ, V_1, empirical masses 4383
  Bristol κ_1-meson, photoelec. det. 4386
  cosmic-ray mesons at mountain altitudes 6123
  κ-mesons 7173
  varytrons, and new mass measurements 7951
  V_1^0-particle 7956
  measurement programme results 8700
production
  contrib. of π^0- by μ- 469
  Fermi's theory 473
  as shower particles in high-energy nuclear disintegrations 944
  slow mesons in glass of photog. plates 1719
  κ-mesons, calc. 1929
    direct production, evidence 5715
  charged V-particles production frequency 1930
  by photons, radiative corrections 1941
    damping corrections 3618
    excitation function calc. 2710
    excitation curve for Be 6227
    in D 448–9, 1146, 5100
    pos./neg. ratio Z-dependence 451
    in complex nuclei, rel. to scattering 2711
    angular and energy distrib. 2713
    in complex nuclei 2714
    photostar computation 7145
  by photons, neutral 466
    in H 1916, 2712, 2715
    in H, high energies 1917, 5102
    in D 2715, 5712
    in D, high energy 1917
  by photons, charged, in H at 0° 8701
    in He, H/He ratios 7955
    in D and H 1148
  double meson photoproduction 611, 5719
  by protons, π^+ creation calc. 3614
    430 MeV on H and Be, π^0 prod. 1147
    345–380 MeV on H and C 1909
    381 MeV, on H, D, C, Cu, Pb 1908
    on D, π^+ to π^- ratio 1938–9
    π^0 production rel. to A 3620
    in neutron collisions, π^0 prod. 3621
    pion production ratio 7170
    341 MeV, on protons, π^+ prod. 7954
  as shock wave problem 1942
  plus/minus ratio, pions, charge-symmetry test 2686
  multiple, in nucleon-nucleon collisions 2735–6
    Fermi theory calc. 3617
    and charge-independence 1934
    in cosmotron n-p collisions 8688

Mesons—*contd.*
  production—*contd.*
    suggested scheme involving "isobars" 2739
    pseudoscalar, rel. to impact parameter 3615
    photomesonic fission of Bi 5075
    in energetic nucleon collision 5101, 7950
    review 5103
    neg. μ-mesons, nuclear emulsion study 5107
    V^0, from low-energy nuclear interaction 5718
      by cosmotron, analysis 7171
    heavy mesons in nucleon-nucleon collision 6239
    in passage of photons through matter 7165
    μ-meson spectrum underground 7753
    and field energy localization 7960
    π, at 2000 m, in various materials 8209
    μ, optical model 8498
  scattering
    by mesons, co-variant formalism appl. 626
    charge symmetric, psc., by nucleons 629
    in nucleon/nucleus collisions, cosmic rays 1735
    large-angle, by atoms, electron ejection 1851
    π–nucleon, *S*-wave 1933
      weak and extended coupling 2203
      nonrelativistic, 4th-order corrections 5859
      non-adiabatic treatment 8235
    π-mesons by protons, Coulomb effects 1935
      charge effect for "excited nucleon" 4378
      elastic, in emulsions, + and − cross-sections 4387
      58 MeV π^+, differential cross-sections 7167–8
      + and − angular distributions 7176
      polarization of recoil nucleon 7957
      compared to $p(\pi^+, 2\pi^+)n$ 7952, 8699
    multiple, Coulomb, high-energy pions in emulsions 1940
    by deuteron, impulse approximation corrections 2206, 5857
    π-mesons in complex nuclei, rel. to photoprod. 2711
    by carbon nuclei, in terms of nuclear potential 4338
    review 5103
    π^- + D, elastic 5105–6
    34 MeV π-mesons, charge exchange, in H and D 6236
    pos. mesons, 584 MeV, phase shift anal. 7168
    pions in H and He, cloud chamber study 7175
    π^+, by Al 7958
    π, by nuclei, optical model 8498
    μ-mesons, anomalous, underground 8499
    classical, of neutral mesons, calc. 8698
    μ-mesons, anomalous scattering in Pb 8703
Metallurgy
    centrifugal furnaces, solar-energy heated 184
    equilibrium diagrams (book) 482
    transformations, proof with needle counter 801
    structures study, emission electron microscopy 1183
    C estimation in steel, artificial radioactivity method 1234
    X-ray analysis, conf. report 1253
    h.f. furnace tech. for volatile component alloy fusion 1322
    furnace charge calc. methods 2118
    microradiography, fluorescence X-rays appl. 2126
    B detect. in B steels, autoradiographic tech. 2129
    metal physics progress (book) 3779
    corrosion of steel 5122
    selected area observation, electron and optical microscopes 7973
Metals
    noble, light absorpt. rel. to van der Waals cohesive energy contrib. 139
    opt. constants dispersion, photog. meas. 157
    thin evap. films, opt. constants photoelec det. 158
    elliptical polarization of light, photoelec. analysis 168
    N impurity distrib. throughout samples 483
    structure, X-ray studies 487
    elastic consant meas., conf. rep. 488
    thermomag. and galvanomag. effects 836
    elec. conductivity changes at melting 838
    charged particle ionization loss in, density effect 932
    pos. Hall coeff., electron-inertia expt. 986–7
    crystals, cleavage surface plastic deform. features 1164
    hardness (book) 1198
    optical and i.r. reflectivity, low temps. 1556
      i.r. reflectivity, theory 1557
Metals—*contd.*
    θ values by Debye theory 1594
    cold-worked, elec. resist. rel. to deformation te 1648
    work-hardening, theory 1991, 7996
    solidification, prismatic substruct. formation 2046
      controlled, single and bicrystals prep. 2047
    paramag. relaxation time of electron spins 2550
    electron theory, electron/lattice-vibrations interact 2580, 6980
      magnetic props. interpretation 3421, 8511
      electronic struct. of transition metals 4240
      nearly free electrons, exchange energy 4242
      band theory, review 6981
      low-temp. thermoelectricity study 7690
      some difficulties 7817
      absorption of light 8394
    diffusion, recent work 3630
      coeff. rel. to interatomic interaction 7968
      review 7969
    septum permeation by H from flames 3635
    relationships with gases, review 3636
    oxidation at high temp., mechanics 3637
    flow of metals (review) 3651
    internal friction, review 3674
      theory 7227
    H_2O_2 formation at fresh metal surfaces 3690
    nucleation, review 3714
    metal physics progress (book) 3779
    surface properties, symposium 4400
      surface effects in plastic deformation 490
      surface energy det. by molec. orbitals 3479
    fatigued, struct. changes 4426
    thermal conductivity, low temp. 4758
      low temp. and high mag. field 6698
    non-elastic scatt. of electrons 5518
    effect of pressure on tensile properties 5740
    molten mixtures, surface tension temp. coeff. 5889
    liquid, spreading on solid surfaces 6526
      as coolants for nuclear reactors 7947
      lab. pumps for 8042
    condensation of vapours on hot surfaces 6711
    elec. conductivity, effects of alloying 6789
    creep, in pure metals 7220
      and recovery mechanisms, review 7221
    micro-hardness anomalies, theory 7223
    alkali, solutions in liq. NH_3, theory 7503
    interionic forces 7813
    atomic radii, table 7845
    preferred orientation rel. to elastic constants 7985
    Bauschinger effect in face-centred and body-centr cubic metals 7995
    valency of transition, in alloys 8035
    suitability for nuclear reactor structures 8153
    alkali, interpretation of optical constants 8395
Meteorological instruments see also *Anemomete Barometers; Hygrometers; Ionosphere measur apparatus*
    r.f. mass spectrometer for upper air research 558
    i.r. solar spectroscopy in high-altitude aircraft 559
    radio-meteorology, joint commission 1278
      in Japan 1300
      in New Zealand 5592
    radar, for precipitation studies 1287, 2094
      natural rain 1288, 4505
      frontal precipitation and lightning 2848
      in areal rainfall meas. 5806
      10 cm radar scatt. by melting ice sphere 5809
      at Sydney, N.S.W. 6330
      detection of rain, etc., conf. rep. 6973
    cm-wavelength scattering invest., for radar interpre tion 1780
    radio wave scatt. by meteorol. particles, in rac theory 1781
    radar, applications, conf. rep. 2094
    Kew Mk II radiosondes comparison 2840
    cloud-droplet sampler for aircraft 4496
    condensation nucleus counter, photog. record 4501
    atmospheric elec. field recorder 4515
    radar localization of aurorae 4519
    natural tritium applications 5805
    for ionospheric echo phase change meas. 7347

A complete list of the Subject Headings will be found at the end of the Index.

eteorological instruments—*contd.*
    for winds, echo sounding with radiosonde 8122
    collection of atm. powders 8123
    balloons method for long high-altitude exposures 8810
eteorology
    fluid dynamics appl. (book) 640
    radio-meteorology 1278, 1301, 2857, 6973
      in Japan 1300
      in New Zealand 5592
    sferics, meteorolog. situation rel. to location 1299 7366
      tornado identification appl. 1303
    recommended values of functions and constants 3766
    handbook of statistical methods 4495
    "weather perception" by individuals 8809
eteors
    meteorites, data appl. to elements abundances table 10*
      cosmic-ray contrib. to He content 1340, 8510
      as cosmic-ray meters 4182, 6397
      rel. to comets, colloquium 6392
    nature of decay of trail 582
    conditions at surface, phys. theory 2148
    radio echoes, long-duration on 33 Mc/s 2855
      meteor trails 3802
      from trails, decay 4560
      effect of radar sensitivity on echo durations 6389
      length of trails detectable 6390
      delta Aquarid shower (1950) 6391
      observations (1952) 7394
    bibliography on meteoritic dust 3801
    decelerations, atm. densities det. appl. 5232
    Quadrantids, hourly rate at max. 5274
      radiants 5275
    zodiacal light and gegenschein, photoelec. invest. 5835–6
    interplanetary matl., rel. to comets 6402
    orbit of δ Aquarid stream 7395
ethane
    reactions with *n*-activated I 515
    electrons and α-particles, energy per ion pair 933
    Hg photosensitized oxidation 2021
    3rd virial coeff. 2259
    slow oxidation, PbO inhibiting effect 2800
    solid, states from nuclear mag. reson. 3474
    structure, quantum-mech. treatment 3511
    W log *p* diagrams 4065
    liquid, compressibility, molec. radius, association, from sound velocity 4664
    intermol. force constants 5618
    halogenated, vibration frequencies 5633
    molecular consts., CH_2BrCl 5635
    adsorbed on rutile, thermodynam. props. 6737
    analytical wave functions 6992
    diffusion in CH_4–TCH_3 system, to 300 atm. 7504
    deuteromethanes, vapour pressures 7626
    u.s. velocity in, up to 950 atm. 8286
ethyl acetate
    vapour, refractivity 726
ethyl alcohol
    vapour, refractivity 726
ethyl chloride
    ultrasonic dispersion 1455
    centrifugal distortion effects 7820
ethyl iodide
    C–I bond dissociation energy 350
ethylene fluoride
    microwave spectrum and structure 3136
ethylene halides
    i.r. spectra, mol. consts. 2353
ica
    synthetic fluorophlogopite mica 2804
icrometry see also *Interferometry; Strain gauges; Thickness measurement*
    eye-piece device for position location 3893
icrophones see also *Acoustic transducers*
    probe-tube, calibration and use 2292
    probe, sound press. meas. appl. 3959
icroscopes see also *Electron microscopes; Ion microscopes*
    flying spot 175
    u.v., objective for ordinary microscope 1567
      refracting type 4048

Microscopes—*contd.*
    X-ray, scanning 2476
      shadow microscope 5509
    straightness of stage, 2 meas. methods 2974
    catadioptric objectives with concentric mirrors 4050
    aberrations and obstruction, effect on contrast 5379
    for nuclear emulsion track meas. 8171
    ultrasonic, description 8298
    design, physiological optics appl. 8827
  phase-contrast
    book notice 789
    conversion of ordinary microscope 2397
    new amplitude-contrast method 3198, 5431
    interference, colloquium 3199
      principle and advantages 3200
      new forms 3201
      compared with phase-contrast 3202
      comprehensive vector theory 3203
      for opaque objects 4047
      interferometer, for optical thickness meas. 4742
      using spar cut ⊥ to axis 6686
      for large reflecting objects 8351
    colloquium 3199
    compared with interference methods 3202
    comprehensive vector theory 3203
    isolated continuous irregularity case 3205
    resolving power 3206
    interference filter used as phase plate 3207–8
    variable phase contrast 3209
    equipment for use with Cooke u.v. microscope 3210
    re-imaging attachment 3211
    infrared equipment 3212
    phase plates by reflection 3213
    strip phase plate, appl. 3218
    u.v., visual or photog. 4048
    Leitz apparatus, uses with Heine condenser 5989
    theory of images 5990
  reflecting
    in i.r. spectrometry, review 730
Microscopy see also *Electron microscopy*
    diffraction, X-ray focusing appl. 174
    flying spot microscope appl. 175
    thickness measurement, fine particles 637
      using 3-beam interferometry 779
    new method for transparent objects observation 780
    u.v., television 787
    cantilever microtome for precision sectioning 790
    light-profile, radii of curvature meas. 1401
    X-ray, scanning technique 2476
    metal surface fine struct., light-slit tech. extension 3215
    shadow, for height meas. 4049
    polarized light exam., effect of objectives strain 4750
    textile fibre exam. methods, conf. rep. 5127
    object-image rel. as linear filter, information theory appl. 5378
    large working distance app. for atomizing jet study 7619
    method of observing selected areas 7973
    photography without an eyepiece 8352
    electric micromanipulator 8353
  phase-contrast
    thick objects 788
    book 789
    ultrasonic wave visualization 2286
    degree of contrast calc. 2396
    and electron-, combined 2761
    new method for unstained specimens 3198, 5431
    and interference contrast, colloquium 3199
    and interference, comparison 3202
    and interference, comprehensive vector theory 3203
    and multiple beam interference, simultaneous 3204
    of isolated continuous irregularity 3205
    interference filter used as phase plate 3207–8
    equip. for Cooke u.v. microscope 3210
    re-imaging attachment 3211
    infrared 3212
    phase plates by reflection 3213
    phase structures seen in ordinary microscope 3214
    glass surfaces exam. 3216
    of optical surface polishing defects 3217
    narrow strip phase plate, appl. 3218
    and interference, of birefringent objects 3219

A complete list of the Subject Headings will be found at the end of the Index.

Microscopy—*contd.*
- **phase-contrast**—*contd.*
  - grating quality control 3220
  - grating periodicities anal. 3221
  - liq. refract. index appl. 3222
  - variable contrast methods, aerodynam. fields appl. 3223
  - variable contrast, unresolved opaque particles meas. 3224
  - contrast increase by sensitive colour 3225
  - cytology appl. 3226
  - of ciliary infusoria 3227
  - of living objects 3228
  - detection of unresolved objects by interference method 6685

Microseisms
- 4 to 100 c/s range, origin and nature 5226
- man-made sources, anal. of vibrations 5227
- influence on electrometer 6443

Microwave spectra see *Spectra, radio-wave*

Microwave spectrometers see *Spectrometers, microwave*

Milky Way
- interstellar absorption var. with wavelength, three regions 7
- H 1420 Mc/s line emission 8
- structure problems 3822
- brightness fluctuations 3823
  - stochastic process example 8180
- spiral struct., interstellar radio emission data 3824
- galactic light, radiation transfer formula 3840
- r.f. radiation model 7393

Mineralogy
- differential thermal anal., interpret. 2039
- coloration and luminescence (book) 7295
- electron microscope exam. of polished surfaces 7984

Mirages see *Atmospheric optics*

Mirrors see also *Microscopes, reflecting; Optical lever; Telescopes, astronomical*
- parabolic surface obtained by heat deformation 172
- testing methods at Palomar 579
- pseudo-spherical X-ray mirrors 4130
- paraboloidal, new line board test 4751
- **geometrical optics**
  - spherical, finite-difference eq. appl. 1483
  - Fresnel, aberrations 3084
  - concave, wave field in front of 4669
  - 3-plane mirrors, parallel reflection 7542
  - paraboloidal, % correction, permitted tolerance 7543

Moisture see *Atmosphere, humidity; Humidity; Permeability, mechanical*
- in granular matls., elec. meas. 5185
- moisture content meas. by neutron counting 7265

Molecular beams
- Li^6F^{19} r.f. spectra, elec. reson, method 743
- CsCl molec. const. by elec. reson. 1806
- elec. reson. transitions in tapered field 1946
- Mg, Zn, Cd, condensation, crystal struct. 2078
- NaCl, r.f. spectrum, dimerization 3490
- l.f. mag. resonances, diatomic molecules 4257
- high-speed, production with rotors 4627
- K, scattering by second beam 5110
- Sb and Cd jets, condensation factor rel. to support, etc. 7180
- e.m. field strength data 7789

Molecular relaxation see *Molecules, relaxation*

Molecular volume
- NaCl partial molal vol. calc. 1998

Molecular weight
- polymers, rel. to soln. viscosity 6302

Molecular weight determination
- light-scattering method, glycogens appl. 519
  - use of unfiltered light 520
  - potato amylopectin 2033
- by thermistors, compds. in org. solvents 3698
- macromolecules, from osmotic pressure 4644
- effusion method, causes of error 5182

Molecules see also *Kinetic theory; Spectra*
- quantum theory of matter (book) 26
- chemical reactivity study 995
- motion in solids, proton mag. reson. invest. 1827
- chem. struct. rel. to nucleus radioactive props. 1863
- I atom recombination, in rare gases 3482
  - photoelectric observation 5613
  - energy transfer 5614

Molecules—*contd.*
- stability of positronium compounds 4293
- $MnCl_2.4H_2O$, magnetic saturation and appar molec. field 4915
- O_4 present in O_3, mass-spectrom. study 4942
- positronium chloride, energy calc. 4943
- press. and vibr. degeneracy effect on unimo reaction rate 5155
- molecular evap. of group IVB elements 5524
- free atoms recombination rate 5615
- H bond spectroscopic phenomena, quantum the 5619–20
- transient molecules, invest. by transmitted li modulation 5765
- intra- and intermolec. contrib. to nuclr. mag. res spectrum 2nd moment, separation 6161
- He repulsive potl., nonadditivity 6162
- molecular and atomic functions rel. 6988
- α-particle and proton interaction inside Bi^{212} molecule 8656
- **configuration, dimensions**
  - det. from microwave spectroscopic data 1822
  - bond geometry, rel. to chem. functions 2034
  - internal coordinates under covering operatio transformation props. 2601
  - covalent radii rel. to surface tension 6521
  - interatomic distances, calc. 7018*
  - reflection spectra appl. 8324
  - **inorganic**
  - XYH_3 molecules, microwave study 742
  - A_3F_3 from microwave spectra 5396
  - AsH_3 1821
  - B_4Cl_4 2600
  - B_4Cl_4 8103
  - BrF_5 1551
  - CF_4 4268
  - phosgene, $COCl_2$ 7328
  - ClF_3 at −120°c 4265
  - ClF_3, vapour phase study 4266
  - ClO_2 1530
  - $FeCuO_2$ 5643
  - HCN, DCN, from i.r. spectra 3141
  - HCNS, microwave det. 8622
  - free HCO radicals 5964
  - HCl, DCl bond lengths 6638–9
  - H_2O_2 522
  - hydroxylamine from i.r. spectra 2592
  - I vapour, optical effective dia. 3106
  - ice 7014
  - iodosilane, from microwave spectrum 2347
  - LiF internuclear distance 1019
  - polymolybdates, light scatt. invest. 5984
  - N_2 4260
  - ND_3, disproportionation 365
  - NH_4^+, C–N bond lengths 6992
  - Nb–N compds. 6317
  - Ni carbonyl 7327
  - O_2, N_2, Cl_2, CO_2, CS_2, modified Silberstein opti anisotropy model 1820
  - O_2, N_2, A, CH_4, H_2, radius, from sound vel. me 4664
  - O_3 5644, 5957
  - PH_2D and PHD_2 5645
  - S_8 ring, optical absorpt. invest. 2356
  - SH 1527
  - SiH_3Cl 5397
  - SiD_3Cl 4716
  - SiD_3F 4715
  - uranyl and transuranium (v) and (vi) ions 3149
  - **organic**
  - polyacenes, diamag. anisotropy 326
  - pyrrole, planar struct., microwave spectrum evide 366
  - bromoform 367
  - aromaticity of conjugated monocyclic hydrocarb 521
  - anthracene 1015
  - chloroacetyl chloride, bromoacetyl chloride a bromide, rotational isomers 1016
  - cyclobutane 1017
  - cyclopropene, C_3H_4 1018
  - naphthalene-d_8 in naphthalene, i.r. study 1518
  - dichlorobutine, hindered rotation 1811

olecules—*contd.*
configuration, dimensions—*contd.*
organic—*contd.*
CH$_3$ valence theory 1815
insulin structure 1819
quinhydrone-type molecular compds. 1823
pyramidal molecules, i.r. spectra data 1824
$CF_3{-}C{\equiv}CH$, electron diffract. det. 1825
H bonding effect on OH hindered rotation, alcohols 1826
C$_8$H$_{13}$Br, C$_8$H$_{13}$Cl 2336
methylene halides, from i.r. spectra 2353
metallo-organic compds., instability 2797
dimeric carboxylic acids, COOH and COOD groups, i.r. absorpt. study 3123
methylene fluoride, from microwave spectrum 3136
tertiary butyl fluoride 3137
pyridine-pyrrole system and H bonding 3513
ethyleneimine 4015–16
solid *cyclo*hexane 4267
nature of H bridge 5183
CHD$_3$ from i.r. spectra 5398
scattered light depolarization by molec. chains 5426
octamethylnaphthalene, X-ray analysis 5785
trimethylaluminium dimer 6301
ferrocene and ruthenocene 6618
α- and β-hexabromcyclohexane 6627
fluorobenzene, from microwave spectrum 6634
3 solid benzenes, nuclear mag. resonance 6985
C–H bond lengths in CH$_4$ 6992
hydrocarbons, bond distances rel. to energies 6998
ethylene 7015
triphenyl methyl bromide, anomaly 7017
n-paraffins, polarizability and configuration 7023
crystall. 2, 2-dinitropropane, room temp. disorder 7293
maleic acid, X-ray analysis 7337
pyridine, microwave invest. 7573
CH$_3$I, CD$_3$Br, CHF$_3$, CHCl$_3$ from rotn.-vibr. spectra 7580
resinic acids and derivs., Raman tech. 7599
benzene, C–C and C–H bond distances 7600
1, 2 dichloroethane 8115
macromolecules
protein and tobacco mosaic virus, i.r. dichroism study 126
crystallite length, statist. theory 371, 3516
linear high polymers, orientation rel. to strength 492
multicomponent systems, light scatt. 784
crystall. chlorophyll derivs., spectra rel. to size 1513
excluded vol. effect, polymer chains, analogous random walk problem 1830
polyethylene cross-linking, by pile radn. 2022
effect on physical properties 4455
effect of interactions between chain segments 2602
proteins in solution 3132
v. stiff chain molecules, light scatt. 3187
configuration of polyelectrolytes 3484
randomly coiled chains, mean sq. radius 3514
vol. effect in polymer chains 3517
high polymers, u.v. absorpt. study 4024
mol. wt. det. from osmotic press. meas. 4644
NH out-of-plane deformation freq. in peptide link 4934
polymethylene, size var. with temp. 4956
cellulose elementary fibrils 5728
random coil light scatt., ang. distrib. 5985
determination methods, review 7024
size distrib. in N-carboxyamino acid anhydride copolymerization 7259
polyethylenes, size rel. to fusion temp. 7260
linear long chain, size calc. 7828
linear polymer biaxial orient., effect on strength 7998
meas. in monomolecular layers, stearic acid and castor oil 8261
theories of measurement 8628–9
scale models of amino acids peptides, proteins 8630
cis- and *trans*-polydiene, chain length 8631
dissociation see also *Heat of dissociation*
cyclopropane under electron impact 999
intramolec. C isotope effects in decarboxylation 2002
I$_2$ in water, rel. to I/solvent interaction 3134
dissoc. molecules fluorescence, polarization 3153

Molecules—*contd.*
dissociation—*contd.*
and free atom recombination calc. 5615–16
organic, molecules by electrons in e. microscope 7204
energies
diatomic interhalogens 201
F$_2$ 3491, 6159, 6641
HI 7818
Hg$_2$ 352
Hg–C bonds 7262–3
N$_2$ 2788, 8614
SH 1527
C–I bond in CH$_3$I, electron impact meas. 350
C–Br bonds in bromo-naphthalenes, *q*-bromo-phenanthrene, *q*-bromo-anthracene 1000
C–C bond, ethylene, from dideuteroethylene data 1229
in toluene photochem. and thermal bromination 8024
mono-bromo-aryles, C–Br, rel. to struct. 8749
substituted bromobenzenes, C–Br, substituents effect 8750
excitation
NO, u.v. absorpt. spectrum data 3146
perturbations on exciton states 3311
diatomic molecules, molecular orbital theory 3510
active N$_{21}$ theories 5544
afterglow mech. 8614
F$_2$O, by Ne collision, calc. 5612
intermolecular mechanics see also *Association; Collision processes; Kinetic theory, gases; Liquids, structure; Liquids, theory; Solids, theory*
binary collisions influence on gas flow 80–2
energy transfer, hydrocarbon-hydrocarbon systems 347
CO$_2$–CO$_2$ and CO$_2$–N$_2$O, intermolec. potentials 349
long random coil problems, statist. solutions 370
dipole interaction with metals, theory 518
intermolec. force and self-diffusion coeff. 658
London dispersion forces, unlike molecules 992
long-range forces in acetone and methyl alcohol 993
convergence of intermolec. force series 994
relations between struct. and chem. reactivity 995
cohesion theory of polar liquids 1424
cis- and *trans*-dichloroethylene vapours, energy transfer 1457
mixed crystals, i.r. studies 1518
non-spherical macromolecules, intrinsic viscosity, thermodynamics 1596
π-molec. complexes, free-electron model 1802
vibrating molecules interactions 1812
solid polymers, viscosity and self-diffusion 1963
in liquids, rel. to potl. energy 2236
liquid props. rel. to intermolec. forces 2238
in liquid transport processes 2239
intermolecular charge-transfer spectra, regularities 2341
neutron scattering experiments, paraffin, water, ice 2743
oriented molecules, quasi-chemical treatment 3008
gas mixtures, thermal diffusion, forces between unlike molecules 3015
inelastic collisions, energy transfer 3029
long-range attractive forces 3481
intermolec. force rel. to transport coeff. 3483
polyelectrolytes, configurations 3484
interaction of non-sph. non-polar 4660
spectra of systems of interacting particles 5309
N$_2$ and O$_2$ i.r. absorpt. due to intermolec. forces 5386
polar mol., interaction with atom 5609
exchange of energy in collision 5610
ditto, application to Cl$_2$ 5611
additive force fields effect on I atom recomb. 5614
benzene self-complex interaction energy 5617
force consts. from gas data 5618
H$_2^+$, united atom calc. 5626
forces between H$_2$ molecules 6160, 6982
polarization of compressed gases 6549
rel. optical collision diameters from press. broadening 6612
i.r. absorption induction in N$_2$ and O$_2$ 6622
v. d. Waals' *a* and ionization pot. 6899
F force constants 6983
stress relaxation in polymeric media 6984

Molecules—*contd.*
  intermolecular mechanics—*contd.*
    3 solid benzenes, nuclear mag. resonance 6985
    force between unlike molecules, thermal diffusion data 6986
    molecular theory of fluids (book) 7498
    corresponding states, deviations calc. 7646
    dielec. const. theory, polar liquids 7655
    ionic forces in metals 7813
    intermolec. potls. from polar gas dielec. polarization 7819
    polyisobutylene shearing in soln. 8038
    high polymers, intermolec. attraction effect on strength 8040
    protein interaction in soln., adsorpt. on proteins effect 8041
    He, Ne, A; law of corresponding states 8277
    eq. for equilib. distrib. functions, formation 8613
    cutting of glass, molecular tensile strength 8714
  internal mechanics
    naphthalene bands at 3200–2900 Å, assignment 127
    de Broglie wave appl. 996
    ethylene quantum mech. calc. from dideuteroethylene data 1229
    ethylene derivatives, cis-trans isomerization invest. 1230
    virial theorem in Thomas–Fermi theory 1439
    contrib. to W.K.B. method 2588
    linear chain, group theoretical treatment 2590
    props. of Racah and assoc. coeffs. 4246
    HI, theory 7818
      electronic structure
    halogen–H molecules, polarization energy calc. 351
    σ-electrons infl. on benzene lower excited levels 355
    2-centre heteronuclear hybrid Coulomb-exchange integrals 358
    complex unsat. molecules, electronic repulsion integrals 359
    conjugated molecules, FEM as approximation to MO 360
    orbital theory of reactivity, aromatic hydrocarbons 361
    carotenoids, absorpt. spectra, Tomonaga-gas model 362*
    σ-values for pyridine and other azo-substituted hydrocarbons 363
    fundamental ion in oxazines series 364
    H_2, electron distrib. 369
    indistinguishability of electrons in theoret. chem. 997
    ground-state energy, config. interaction calc. 998
    NpO_2^+ and PuO_2^{++} ions, visible and near-i.r. spectra interpret. 1011
    anthracene, molec. orbital study 1015
      electronic spectrum 8617
    $C^{13}O^{16}$ electronic emission spectrum 1507
    $n \rightarrow \pi$ transition in nitroso-absorption 1515
    plane and space lattice of similar atoms, combination of orbitals 1797–8
    tetrahedral and octahedral symmetry, Thomas–Fermi fields 1803
    vibration influence on forbidden transitions 1813
    magnetic h.f.s., diatomic molecules 1814
    methyl radical electronic struct. 1815
    polyatomic molecules, orbitals for 2 shapes 1816
    n-electron molecule, HLSP theory exchange terms 1817
    ferrocene electronic struct. 1818
    azulene absorpt. spectra, alkyl shift 1829
    elec. resonance transitions in tapered field 1946
    polarization energy, numerical computation 2586
    HCl, wave-mechanical theory 2587
    localized functions, variation procedure 2589
    ${}^5\Sigma$ and ${}^6\Sigma$ states, spin splitting 2596
    even-even transitions intensities, opposed disubstitution effect 2597
    overlap integrals involving *d* orbitals 2599
    biphenyl, hidden transition 3116
    acenes light absorpt. calc., electron-gas model 3118
    metal surface energy by molec. orbitals 3479
    2-centre interaction integrals 3485
    conjugated polycyclic hydrocarbons, generalized free-electron model 3486
    polymethine dyes, light absorpt. theory 3487
    wave functions, error calc. 3488

Molecules—*contd.*
  internal mechanics—*contd.*
      electronic structure—*contd.*
    interaction of closed shells 3489
    high multiplicity states, diatomic molec. 3498
    nonadiabatic transitions 3499
    thiophosgene, excited states and vibrations 3501
    unsat. hydrocarbons reactivity, free-electron mo 3503
    natural hypsochromic shifts on phenyl substituti 3504
    cyanines, metallic model appl. 3505
    amine dyes, absorpt. spectra calc., metallic mo appl. 3506
    Hammett's eq., ρ-values calc. 3507
    complex unsat. molec., semi-empirical theory 3508
    conjug. org. compds. orbital theory, benzene app 3509
    "semi-localized orbital" treatment, methane 3511
    ditto, *n*-centre and 2-centre orbitals 3512
    molecular orbital theory of organic structure 3701
    mol. orbital theory (review) 3702
    conjugated organic molec., u.v. spectra data 4002
    Cs_3Sb energy structure from photoelectron spectru 4102
    approx. formulae for many-centre integrals 4247
    indene, calculation 4256
    homonuclear diatomic molec., excited state orbit wave functions 4259
    wave functions, elec. polarizability as criterion 426
    LCAO MO theory, π-electron approx., improv ment 4261
    orbital energies, mnemonic device 4262
    WKB method generalization to radial wave eq. 42
    directed valence and determinant wave function 4264
    O_2^{16} and $O^{16}O^{17}$ microwave spectrum data 4714
    bond polarizability from Raman intensities 4731
    benzene, new electronic state 4946
    O_2, from $O^{16}O^{17}$ spectrum analysis 4947
    O_2, new forbidden transitions 4948
    polarizability in strong fields 4955
    nature of H bridge in diborane 5183
    diamond, electronic struct. 5202
    NaCl strain-optical constants interpret. 5427
    Kuhn's theory of natural rotatory power 5428
    organic molecules, quantum mech., review 5621
    steric effect and cyclization influence on C and electronic struct. 5622
    3-centre integrals 5623
    nature of exchange energy 5624
    complex unsaturated, theory of electronic structure 5636
    "molecular diagrams" in orbital methods 5639
    alternant hydrocarbons, orbital theory 5640
    effect of $3p$ atomic orbital on double-bond energ 5641
    molec. theory of Rayleigh scatt. in crystal 5777
    constants calc. from X-ray absorpt. spectra 6071
    X-ray absorpt. fine struct. temp. dependence, solid 6072
    F_2, excited states, unified orbital theory 6164
    O_2, slow neutron scattering invest. 6243
    benzene 2600 Å transition, excited state 6624
    $(NH_4)_2IrCl_6$, covalent bonding 6952
    aromatic hydrocarbons, diamag. anisotropy, calc. 695
    a molecular sum rule 6987
    method of variations applied to wave functions validity 6989
    most probable electron config., importance 6990–1
    CH_4, NH_4^+, wave functions 6992
    Fermi–Thomas method appl. 6993
    HF, quantum orbital calculations 6994–5
    naphthalene, first 2 excited singlet states, symmetr assignments 7003
      electronic spectrum 8617
    electronic spectra of conjugated hydrocarbons 7004
    MO method and valence bond function rel. energie 7007–8
    LCAO self-consistent field calc. of π-electron levels fulvene 7009
    conjug. molec., LCAO MO calc., free electron mode appl. 7011

olecules—*contd.*
internal mechanics—*contd.*
electronic structure—*contd.*
benzene and butadiene, reson. energies 7010
molecular orbital theory of valency 7012–13
polarizability of H_2 molecular-ion 7019
electric polarizability 7020
n-paraffins, polarizability and configuration 7023
charge on H atoms, stability effect 7257
orbital theory, extension 7825
united-atom treatment of conjugated systems 7826
spatial relation of electrons 7842–3
polarizability, methods of calculation compared 7851
chemical bonds and electron states 8036
2-centre integrals, estimation 8615
π-electron interactions in acetylene 8618
H_2^+, ground state quadrupole transitions and isotopic ion dipole transitions 8619
localized orbitals, perturbation, charge distrib. effect 8623
$C_6H_7^+$ and other hydrocarbon ions, hyperconjugation 8624
H_2O ground state, orbital calc. 8625
conj. systems, free-electron network model 8626
inner shell electron distortion 8627
nuclear coupling see also *Spin-lattice coupling*
HD nuclear resonance, spin-spin interaction 356
HD gas, nuclear spins interaction 357
XYH_3 molecules, microwave study 742
quadrupole coupling constants and molec. vibrations 1013
spin echo measurements 1014
Al^{27}, elec. quadrupole, in spodumene, 2nd-order effects 1845
nuclei, pseudo-quadrupole effect 2598
nuclear mag. reson, multiplets in liquids 2617
interatomic elec. quadrupole-quadrupole, in Ce salts 3502
effect of substituent on F^{19} nuclear coupling in benzene compounds 3699
accelerated nuclei spin interactions 4258
quadrupole spectra, 2 B trialkyls 4949, 7005
$HgCl_2$ quadrupole resonance 4950
Cl elec. quadrupole resonance 5638
hexachlorobenzene, pure quadrupole spectrum 4951
Bi^{209} quadrupole spectrum in Bi triphenyl 4952
CH_2ClCO_2H, quadrupole resonance 5632
p-dichlorobenzene, quadrupole resonance line 5637
D_2 and H_2 nuclear r.f. spectra, intermed. and strong fields 5655
electron-coupled interactions between spins 7006
solid H, nuclear mag. reson. line shape 7796
alkyl bromides and iodides 8321
Br nuclear quadrupole reson., molecular solids 8621
S^{33} coupling const. in HCNS 8622
vibration, rotation
OH vibration-rotation bands anal. 121
PF_3, POF_3, PF_5, force constants 136
rotational, centrifugal distortion effect on, asymmetric-rotor molecules 353
vibrational spectra selection rules, linear molec. 354
OCS and N_2O 6 mm spectra analysis 741
NF_3 and PF_3 force const. and thermodynam. functions 744
CO_2 vibration-rotation bands, integrated absorption 762
ethyl alcohol, internal rotation barriers 822
rel. between vibrations and chem. reactivity 995
$R_2C_2R_2$-type, totally symmetrical vibr. modes 1001
rotational line strengths, slightly asymmetric rotors 1002*
normal vibrations classification 1003
phosphine-*d* and -d_2, vibrational frequencies 1004
para-dihalogen-benzenes, limiting eigenfreq. calc. 1005
ethane and deuteroethane, vibr. spectra and action coeffs. 1006
dimethylacetylene vibr. freq. and action coeffs. 1007
methyl acetylene and methylhaloidacetylene, action coeffs. and vibr. freq. 1008
decaborane vibrational frequencies 1009
O–H stretching frequencies in v. short H bonds 1010
H_2S rotation fine struct. 1012

Molecules—*contd.*
internal mechanics—*contd.*
vibration, rotation—*contd.*
OH apparent rotational temp. studies 1490
Hg_2, vibrational analyses 1503
$C^{13}O^{16}$ molec. constants from emission spectrum 1507
dimethyldiacetylene 1525
SH, SD spectra anal. 1527
hexafluoropropene, vibr. freq. 1532
BrF_5 1551
$CHClBr_2$ and $CDClBr_2$, potl. constants 1804
CBr_3Cl, potl. constants 1805
CsCl const. by molec. beam elec. reson. 1806
molec. consts. from diatomic rotational bands 1807
benzophenones, C = O valence vibration study 1808
CH_3CF_3, complete symmetry group for rotation 1809
ClO_2 vibration potential function 1810
AsH_3 1821
Born repulsion and restricted free rotation 1828
BiH, SrO, BaO, rotational const. from perturb. data 2332
oxalyl chloride, potential constants 2340
S_8 ring, optical absorpt. invest. 2356
CF_3Br, CF_3I, potl. const. 2591
diatomic band systems, vibr. overlap integral 2593
Eckart conditions for polyatomic molecule 2594
o- and *p*-quinones, carbonyl stretching freq. 2595
strong H bonds invest. 2798
OH, vibration-rotation temp. 3113
HCN, DCN, rotation-vibration spectra 3141
uranyl and transuranium (V) and (VI) ions 3149
rotational intensity distrib., OH, vibr. state effects 3150
NaCl, NaF, NaI, dimerization 3490
strained carbonium ions, energies 3492
Morse anharmonic oscillator ground state transition intensities 3493
asymmetric rotational barriers about single bonds 3494
monodeuteromethane, vibration-rotation band 3495
H_2O, asymmetric rotor 3496
rotational isomers, configurations, normal frequencies 3497
$(K + 2)$th order formula for asymmetry rotational doublets 3500
thiophosgene, excited states and vibrations 3501
$N^{14}N^{15}$ vibration spectrum 3995
pure rotational absorpt. in point groups $D_{2d} \equiv V_d$ and T_d 3996
O_3, from i.r. spectrum 4019
ethylene isomers, force constants potential functions 4248–9
diacetylene, normal coordinate treatment 4250
alkali metal, diatomic, oscill. freq. 4251–2
1-dimensional rotation, NH_4I, evidence 4253
vibration-rotation bands, intensities 4254
rotation-vibr. excit. by electron impact 4255
AlH and AlD band-spectra, 2700 Å-system 4704
$AlCl_4^-$ force constants 4727
vibration freq. related to vibrations in metal crystals 4941
C_2F_4, vibr. potl. function 4944
reciprocal k.e. matrix formulation of isotopic splitting 4945
compressional energy and resonance energy 4953
CH_2 mutual rotation function 4956
aliphatic sat. hydrocarbons, near i.r. absorpt. spectra interpret. 5387
benzene near i.r. absorpt. spectrum interpret 5388
SiH_3Cl, vibration-force-constants 5397
bipyramidal XY_5 model, vibration 5625
linear chain vibration spectra, intensity distrib. 5627
H-bond compound vibration frequencies 5628
NH_3, and NH_4^+, ND_4^+, fundamental vibrations 5629
loose transition states involving internal rotation 5630
C_2H_3Br and deuterated substitutes, out-of-plane vibr., potl. function 5631
halide methanes vibr. freq., substitution rule 5633
1, 3, 5 triF-benzene, nonplanar vibrations 5634
CH_2BrCl spectra and constants 5635
kinetic and potl. energy matrices, symmetry factoring 6163
$SiHCl_3$, SiH_2Cl_2, SiH_2Br_2 vibr. spectra data 6623
N_2O_5, vibration interactions 6626

A complete list of the Subject Headings will be found at the end of the Index.

Molecules—*contd.*
  internal mechanics—*contd.*
      vibration, rotation—*contd.*
    HCl vibr.-rotation i.r. band perturbation 6637
    HCl from i.r. spectrum 6638
    ditto, DCl 6639
    polyatomic rotor molec., centrifugal distortion const. 6996
    polyatomic molec., internal parameters from rotat. const. 6997
    hydrocarbons, bond energies rel. to distances 6998
    quinone carbonyl group and derivs., vibr. freq. 6999
    C_2F_6 ν_9 fundamental 7000
    mean thermal vibr. amplitudes limit 7001
    vibr. freq., *F* and *G* matrix calc., perturbation theory 7002
    rotat.-vibr. and moments of inertia of isotopic molecules 7016
    force consts., methods of relating to other molecular quantities 7018*
    CaO band spectrum anal. 7562
    D_2O, vibration-rotation 7575
    HDO, vibration-rotation 7576
    CH_3Cl, centrifugal distortion effects 7820
    CF_3CH_3, Urey–Bradley potl. function anal. 7821
    rotational coordinates sep. from *N*-particle Schroedinger eq. 7822
    zero-point energy of vibration calc. 7823
    NaCl, oscillation frequencies 8055
    halo-methane vapours, u.s. dispersion data 8289
    multi-atomic vibr., dependent coordinates exclusion 8616
    NH valence freq. in pyrrhole and benzopyrrholes 8748
    synth. polypeptides, i.r. dichroism 8752
  moments
    bond moments and induced moments 368
    H_2, rotational magnetic moment 369
    mag. moments coupling, molecules with 3 Fe atoms 966–7
    dipole, LiF 1019
      XYH_3 molecules, microwave study 742
      modified Silberstein optical anisotropy model appl. 1820
      from Stark effect, NF_3, PF_3, POF_3, HCN, CH_3CN, CH_3NC, CH_3F, CH_3CCH, SiF_3H 2603
      and polarizabilities, classical model 3515
      calculation methods 5646*
      and electric polarization and dipole moments 7021
      HI 7818
      of organic acids from adsorption meas. 7827
      effect of perturbations of localized orbitals 8623
    high temp. susceptibility, permanent dipole lattices 3428
    rotational, magnetic, Zeeman effect appl. 3998
    elec. moment rel. to internuclear distance 3999
    PH_2D and PHD_2 5645
    ICl, calc. 5647
    reaction field of a noncentral dipole 6165
    electric, of mesomeric systems 7022*
    statist. mech. of interacting dipoles 7473
    benzene, rotational Raman spectrum data 7600
  physical structure see *Bonds; Chemical structure; Crystal structure, molecular; Molecules, configuration*
  relaxation see also *Acoustic wave propagation; Dielectrics; Liquids, theory; Magnetic relaxation; Nuclear magnetic resonance; Paramagnetic resonance absorption*
    dielectric, in *d*-camphor 211
      solid state benzene derivs. 210, 7659
      in glycerol, rel. to u.s. relax. 1456
      in dipole liquids 2436
      in nitrobenzene and *o*-nitrotoluene 3194
      organic liq., rel. to assoc. 4786–7
      in glycerine 6754
      in solution 7651
      in ethanol below -147°c 8391
    vibrational relaxation times calc., gases 348
    methyl chloride, data from u.s. dispersion 1455
    relaxation time and internal field 4075
    dipole, fundamental formalism 4791
    stress relaxation, polymeric media 6984
    halo-methane vapours, u.s. dispersion 8289

Molybdenite
    electrical properties 6768
Molybdenum
    film, protection by evap. SiO layer 1177
      elec. conductivity phenomena 4797
    cold-worked, resistivity rel. to deformation tem 1648
    electron ejection by He^+, He^{++} and He_2^+ 1693
    Schottky effect periodic deviations 2517
      surface barrier anal. appl. 6120
    boride, powder, supercond. invest. 4107
    disilicide, thermoelec. evidence for metallic natu 4112
    thermal cond., low temp., mag. field 6698
    magnetic struct., neutron diffract. study 8525
    high temp. mag. susceptibility 8558
Molybdenum sulphide see *Molybdenite*
Monochromators see also *Filters, optical; Light source X-ray monochromators*
    grating, single or multiple diffraction, slit curvatu 112
    Littrow-type, scattered light reduction 2324
    multislit, multipass 2325
    double-beam, multiple 3979
    double-pass, use with ratio-recording spectrophot meter 7553
Moon
    nature of surface, from albedo 1352
    surface temp. calc. 3800
    possible influence on rainfall 5807
    surface temp., heat conduction theory appl. 6695
Multiple stars see *Binary stars*
Music see *Acoustics, musical; Scales, musical*
Musical instruments
    trumpets, acoust. props. 2284
    organ flue pipe function, review 4661
    electrical and mechanical, compared 8297
Naphthalene
    luminescence, X-rays and cathode rays 3163
    anisotropic thermal expansion, 8798
Navigation
    stars and planets visibility in twilight 2915
Nebulae see also *Astronomical spectra*
    radio-sources, identification 9
      angular size-similarity 1337
    rotating mass of gas, temporal evolution 1351
    clusters, in expanding universe 2146
    gaseous, filament orientation 2154
      collisional excitation of H 8195
    planetary, radiation pressure 3819
      radiation press., He II problem 3820
      internal motions 3821
    distance of Magellanic Clouds 5282
    solar nebular origin of planetary system, comets re 6400
    new fine-fibrous system in Auriga 6435
    He atom unstable levels population and gaseou component mass eval. 7403
    turbulence in Orion and effect on variable sta 8194
    network, excitation theory comparison 8196
  extragalactic see also *Galaxies*
    colour index and gradient var. 587
    radio-sources, angular size similarity 1337
    spiral, contrib. to turbulence theory 5834
    photoelectric photometry 7404
Neodymium
    elec. resistivity, low temp. 840
    $Nd(C_2H_5SO_4)_3$, paramagnetic props., theory 693 8385
    thermal expansion anomalies 7624
    Nd_2O_3, paramag. neutron scattering 8527
Neon
    solid-liquid critical point 183
    h.f. breakdown 252, 6814
    containing A, α-particle ionization 291
    rarefied, dionization process 936
    metastable state, lifetime 4290
      ions, range/energy rel. in gases 6099
      energy loss in gases 6868
    specific primary ionization, 0·2–1·6 MeV electro 6116
    glow discharge, effect of microwave pulses 8432

utrino
  current density in quantum electrodynam. 608
  rest-mass, upper limit 1066
  β-recoil study 1861
  supernova neutrino energy 3818
  detection, nuclear recoil 5111
  free, method of detection 5112
  large liq. scint. counter for detect. 6108
  magnetic moment, inner bremsstrahlung data 6211
  emission following μ^--meson nuclear capture 6223
  electron-neutrino ang. correl., interference terms 7093
utron diffraction
  monochromator crystals, Ge and Fe$_3$O$_4$ 1156
  rel. to atomic distrib. in liq. Pb and Bi 2747
  kinematical theory, spin and isotopes influence 2748
  recent progress, review 3626
  high-energy effect, transparency of nuclei 5725
  by gases, theory 7187
  Mg and compounds, cross-sections 8708
eutron diffraction crystallography see also *Crystal structure, molecular*
  neutron optics theory 1157
  cold-worked brass study 1269
  kinematical theory, spin and isotopes influence 2748
  recent progress, review 3626
  density of particle flow 3754
  neutron single crystal analysis 3755
  NaCl-type modification ND$_4$Br and ND$_4$I 3756
  antiferromag. studies in MnF$_2$, FeF$_2$, CoF$_2$, NiF$_2$ 6132
  Mg ferrite study 6134
  PdO investigation 8101
  Mg ferrite-aluminate powders 8116
  magnetic struct. invest., W, Mo, Nb, V, Cr, Mn, Fe 8525
  Zn and Ni ferrite chem. and mag. struct. 8526
  paramag. scattering by Pr, Nd and Eu ions 8527
eutron spectrometers
  fast, scintillation 478
  high transmission velocity selector 3623
  Be crystal spectrometer 3624
  high-speed rotating neutron shutters 4627
  time selector for time-of-flight 4883
  80-channel velocity selector 6241
  scintillation counters (book) 6884
  time-of-flight, for intermed. energies 7192
  spectrum det. by B absorption, in nuclear reactor 7961
  nuclear emulsion technique 8171
  fast coincidence spectrometer 8707
eutrons see also *Cosmic rays, neutrons*
  binding energies, in light nuclei 375
    survey 4960
  electron-neutron interaction, psc. meson theory 623
  nuclear reactor as research instrument 1138
  β-decay 2741
  isobaric states, and π-meson scatt. 4378
  electron interaction deduced from reflection data 5724
  distribution in atomic nuclei 7836
  data need in reactor design 8706
 absorption see also *Nuclear excitation; Nuclear reactions, neutrons*
  total cross-sections, Pb, 37–156 MeV 453
    high-energy, C and H 454
    fast, heavy nuclei 456
    14 MeV, for 50 elements 1137
    Cu, S, 13·3 MeV 3601
    C, Al, Cu, Cd, Pb, 30 to 153 MeV 4361
    H, C, Cu, Cd, Pb, Th, U, 400 MeV 5082
    Au, Cl, P, 100–700 keV 5084
    fast, Cl, Na, Ti, Br 5085
    Cl and C, 0·15 to 1 MeV 7152
    N, Na, Al and Si, 1·9–3·8 MeV 8704
  capture γ-ray spectra, elements $Z = 17$–30 and 45–57 1086
    Cd^{113}, Sm^{149}, Gd^{odd}, Dy^{164}, Hg^{199} int. conversion lines 1092
    Be and C 1893
    Ti, Cr, Fe, Ni, Zn 2670
    Sc, V, Mn, Co, Cu 2671
  fission/capture cross-section ratio 1136
  reactor oscillator method for meas. 1138
  neutron optics theory 1157

Neutrons—*contd.*
 absorption—*contd.*
  Szilard–Chalmers process, review 1861
  resonance parameters from absorpt. integral, U^{238} appl. 1949
  fast, radiative capture in H 3602
  in earth, comparative data 5043
  mean values used in slowing down 5118
  capture cross-section, Em^{222} 7150
    Nd isotopes 4971
    intermed. and heavy nuclei, calc. 457
  concretes, special shielding 7962
  slowing-down length in H mixtures, capture effect 7964
  slow
  (n, d) reactions on sep. Zn isotopes and Ni 452
  thermal neutron capture cross-sections 458
    Sr^{84} 2718
    U^{232} 2726
    Pa$^{231, 232}$ 4367
    H 5083
  pile neutrons, cross-sections, Pb$^{206, 207}$ 1130
    Sc cross-section 3604
    capture cross-sections for Sc^{46} and Sr^{85} prod. 5080
    Bi, absorption cross-sections 7153
    Co^{60}, self-shielding in pile 8690
  cross-sections, rel. to first resonance energy 1131
  Co, Ag, I, Al, Ni, Ga, total cross-sections, 1 eV to 5 keV 1919
  resonance, in U, time-of-flight study 2717
  Be, Na, Mo, Hg cross-sections 1 eV to 10 keV 2720
  cross-sections for Ir, Rh, In, Re, Au, Ag 3624
  thermal energy relax. length, Ra–Be neutrons in water 4394
  Cd^{113}, Co^{59}, Cl^{35}, γ-ray spectra 7106
  cross-sections and slow n-capture, theory 7148
  resonance in Rh, parameters 7151
  thermal neutron-proton capt. 7186*
 detection, measurement see also *Dosimetry; Neutron spectrometers*
  Li-containing phosphors appl. 281
  proportional fission neutron counters 919
  fast cross-sections, methods 1152
  3 detectors for reactor instrumentation 1159, 4398
  system for use with pulsed accelerators 1947
  fluxes from pulsating radiator, det. 2744
  slow neutron counters, B trimethyl as filler 3600
  high-sensitivity fission counter 3622
  with Brookhaven crystal spectrometer 3624
  tri-α-naphthylborine, new scint. matl. 4158
  V-particle cloud-chamber photog., neutron counters appl. 4196
  2 liq. scint. detectors 4396
  borazole soln. in p-xylene containing p-terphenyl 4397
  abs. thermal density in reactor 5096
  simple meas. of average energy 5116
  absolute densities by Co wire 5117
  slow neutron scint. detector 5539
  densities, by autoradiography of detectors 5722
  counter tube appl., anal. 6877
  average no. per Cm^{242} fission 7082
  around JEEP, BF$_3$ counter 7160
  thermal and Rh-reson., distrib. in isotope channel 5–11, by foil activation 7181
  distrib. in JEEP, by Na$_2$CO$_3$ activation 7190
  fast, efficiency of long B counter 7191
  moisture content meas. by neutron counting 7265
  B layer scint. detectors 7963
  continuous detector, for pile densities 8709
  Fe^{2+} differential oxidation 8743
 diffusion
  one-velocity problem, complete soln. 476
  and radiative transfer, variational method 477
  treatment including thermal motion of medium 1155
  transport m.f.p. in D$_2$O, B poisoning method 5115
  thermal neutrons in graphite, diffusion lengths 5119
  thermal neutrons in semi-infinite medium 5723
  transport theory, critical size for reactor 7154
  Cd sheet influence on distrib. in graphite 7183
  slowing-down length, effect of capture 7964

A complete list of the Subject Headings will be found at the end of the Index.

Neutrons—*contd.*
- **effects** see also *Nuclear reactions, neutrons*
  - Pt bombardment, elec. resistance increase 243
  - on Si low-temp. atomic heat 1801
  - polyethylene irradiation, cross-linking caused 2022
  - isothermal ordering of Cu$_3$Au 2753
  - lattice expansion of quartz 2826
  - on ZnS phosphor 3156
  - neutron-capture activation of Br substitution reactions 5173
  - Ag^{107} activation method as alternative to densitometry 6361
  - reduction of diamag. susceptibility 6956
  - degradation of polymers by pile irradiation 8025
  - reversible bleaching of diamond absorpt. band 8062
  - irradiation of azide crystals, explosion production 8735
- **polarization**
  - rel. to spin-orbit coupling 4391
  - from D + D, theory 7133
    - proof, by carbon scattering 8705
  - by *p* scattering in Be, not found 7189
- **production**
  - by absorption of π^--mesons, at rest 470
  - Chatillon neutron density standard redetermination 1139
  - photoneutrons, Si, Ca yield 2708
    - (γ, pn) in P 1129
    - $U^{238}(\gamma, n)U^{237}$, yield 3598
    - background, in reactor 5710
    - in heavy-water reactor 7139
    - cross-sections, rel. to betatron energy 7930
    - excitation functions to 320 MeV 7931
  - fission, Pu^{239}, spectrum 1142
    - U^{235}, spectrum 4371
    - Cm^{242} spontaneous, average no. 7082
    - long-lived, delayed 7937
  - from 14 MeV neutron interactions, energy distrib. 2721
  - in Pb, by cosmic rays 3418
  - by deuterons, on C^{12}, O^{16}, S^{32} 3586
    - on D, Li^7, B^{11}, Be^9, ang. distrib. 1911, 1913, 4353, 8682
    - $N^{14}(d, n)O^{15}$, groups invest. 3587
    - on Be 4351
  - sources in reactors, elementary theory 3669
  - "photon difference method" resolution 4358
  - reactor as source 4372
  - by Fe capture of μ^--mesons, max. energy 6220
  - from μ^- mesons at rest in Pb, Sn, Bi, Al, multiplicity 6221
  - low voltage 14 MeV source 6242
  - by μ-mesons stopped in Pb 6927
  - in U cylinders, fission factor calc. 7156
  - flux distrib. in JEEP, calc. 7159
  - flux distrib., Kjeller U reactor 7161
  - artificial synthesis, possibility 7182
  - by protons, high energy 7914
    - 95 MeV, on D, Li, Be, C, Al, Cu, Pb 5059
    - 245 MeV, on Be, C, Pb, energy distributions 433
    - 375 MeV, on Li, Be, C, energy distrib. 2692
    - from $T(p, n)He^3$, differential cross-section 6226
    - on Be, spectrum in emulsion 3579
    - on Be^9, ditto 7915
- **reflection**
  - meas. using reactor 1138
  - diffuse, from Fe single crystal 1158
  - at Bi/liq.O interface, crit. angle 5724
- **refraction**
  - index for ferromag. medium, calc. 474
  - neutron optics, index of refraction, deriv. 1157
- **scattering**
  - multiple magnetic scattering 474
  - multiple, spin-dependent forces 475
  - 14 MeV, inelastic cross-sections 1133
    - total cross-sections, various elements 1135, 2719, 8686
    - elastic, by deuterons 7185
  - fast, cross-section meas. methods 1152
    - inelastic, nuclear excitation 1918
    - "capture scattering" 1948
    - in O, cloud-chamber study 2746
    - by complex nuclei 5113

Neutrons—*contd.*
- **scattering**—*contd.*
  - slow, in polycrystalline media 1153
    - by Pb, Al, diamond, graphite, energy distrib.
    - by bound protons, cross-sect. temp. depend 3599
    - resonant, Cd, Sm, Gd, Dy, Eu, Rh, In 3625
    - by O$_2$ molecules 6243
    - by *o*- and *p*-hydrogen 7184
    - cross-sections for rare earth nuclides 7933
    - by Mg, cross-sections 8708
  - neutron optics theory 1157
  - thermal and magnetic, diffuse, from Fe single cry 1158
  - elastic, by He 1689
    - 1 MeV, various elements 6240
    - by deuterons, 14 MeV 7185
    - ditto, phase shift calc. 7188
    - by tritons, 2·5–14 MeV 3606, 7155
  - by paraffin, plural and multiple scatt. correcti 2742
  - by coupled paramag. ions 2745
  - by nuclei and magnetic atoms, principles 3626
  - ang. distrib., organic scint. detectors appl. 4150
  - inelastic, by Fe 4362
    - by Cd^{111} 4363
    - by Pb^{204}, ang. distrib. geom. 7121
    - various elements, 14 MeV 1133
    - fast, nuclear excitation 1918
    - 2·7 MeV, ν-radn. 8687
  - cross-section curves rel. to *A* 4366
  - by Mn^{++} ions 4395
  - slowing down in heavy water 5114
  - by walls of laboratory, calc. 5120
  - neutron-electron magnetic scatt., orbital effect 53
  - by potential well, calc. 5648
  - cross-sections in the MeV region 7149
  - by deuterons, 14 MeV, elastic 7185
    - ang. distrib. and cross-sections 4364, 4392
    - elastic, by deuterons, phase shift calc. 7188
    - by bound protons and deuterons 2743, 3599
  - total cross-sections, energy dependence 7934
  - by C, polarization meas. 8705
  - **proton-neutron** see also *Nuclear forces, scatter*
  - differential cross-section for 220-MeV neutrons 4
  - meson theory analysis 621
  - total cross-section at 4·75 MeV 1923
  - by bound protons and deuterons 2743
  - fast, pseudoscalar meson field calc. 3878
  - relativistic, pseudoscalar meson field calc. 3879
  - organic scint. detectors appl. 4150
  - triplet range, new lower bound 4393
  - Fermi scatt. lengths, differential eq. 4618
  - 14 MeV, elastic 7185
  - by *p* in Be, no polarization 7189

Nickel
- radiation damage and recovery 216
- as catalyst, activity promotion by CeO 507–8
- cubic, acoustic waves polarization 691
- thermionic constants 937, 2516
- magnetic properties, magnetostrictive and ΔE effe 989
  - coercivity rel. to magnetocrystall. energy 1758
  - magnetization temp. dependence 1759
  - anomalous Hall effect 1794
  - spectroscopic *g* values 2540
  - collective electron theory 3426
  - initial magnetization under tension 3439
  - of sheets, effects of working 4216
  - saturation magnetization at high press. 4237
  - temp. variation of Hall effect 5599
  - thermal cond., low temp., mag. field 6698
  - fine particles, coercive force 8543
  - in films 8544
  - single crystal, Bitter figures 8550
  - Hall effect, theory 8599
  - rotational relaxation at h.f. 8601
  - u.s. attenuation study 8602
- C solubility and diffusion in Ni 1174
- u.s. waves velocity 1448
- clean and contam. surfaces, field emission 2477
- deformed by rolling, X-ray study 2758

A complete list of the Subject Headings will be found at the end of the Index.

:el—*contd.*
elec. resistance, 50–80°K 3263
  rel. to elec. field 4108
  cold-worked wires, Matthiessen's rule validity 4422
  conductivity phenomena in films 4797
septum permeation by H from flames 3635
films, annealing of stresses, rel. to vacancies 3724
single crystals, elastic constants 4416
surface tension at m.pt. 5323
use in vac. u.v. photocell 6796
reflectivity in Schumann region 7605
friable cathode deposits, X-ray study 7980
Bauschinger (work hardening) effect 7995
energy release in deformed Ni 8722
thin films, sorption properties 8747
:el carbonyl
molecular structure 7327
:el ferrite
Ni–Zn ferrites, spontaneous magnetization 958
  ferromag. resonance 4212
  magnetic viscosity 5575
  cores, a.c. losses 6130
  cores, permeability 6144
  (Ferroxcube-IV), dynamic elastic and magneto-elastic constants 7811
  h.f. dispersion 8536
  permeability tensor meas. 8548
  Richter type after-effect 8571
  ferromag. Faraday rotation, microwave 8598
spontaneous magnetization 958
Hall effect 988
magnetic behaviour 1746
g factor 1747
single crystal, magnetostriction 1795
microwave dielec. const. and permeability 4079
l.f. dispersion 4081
Ni–Cd ferrites, magnetic behaviour 4206
magnetic transition 4209–10
exchange freq. electron spin resonance 4905
chem. and magnetic struct., neutron diffract. study 8526
spin-lattice relaxation time 8538
Cu–Ni ferrite, spontaneous magnetization, temp. var. 8578
el fluoride
NiF_2, neutron diffract. antiferromag. study 6132
el hydroxide
sols, crystallite growth 7281
el oxide
NiO, antiferromag. reson. 8541
el sulphide
elec. conductivity and thermoelec. power 848
t sky see also *Atmospheric spectra; Aurora; Twilight*
airglow research, conf. 2842
  OH, high latitudes 6333
  active N airglow theory 6334
uminous, observations, survey and theory 3778
u.v. region photometry 4512, 7630
ight pulses assoc. with cosmic rays 4513, 8132
photometry, diffusion corrections 5249–50
zodiacal light, structure 5276
um
paramag. reson. absorpt. 5568
heat conductivity below 1°K 7688
magnetic struct., neutron diffract. study 8525
high temp. mag. susceptibility 8558
boride and nitride, powders, supercond. invest. 4107
um nitride
powder, superconductivity invest. 4107
: oxide
lecomposition kinetics, reaction products effect 1212
  O catalytic influence 5156–7
  spectrographic absorpt. invest. 5742
nd aq. solns., Raman spectrum and struct. 1550
nagnetic props. in clathrate cpd. 3438
hoto-ionization, in *D*-layer formation 5236
cellulose
hin films, bonding to solid surfaces 496
gen
Maxwell reflection coeff. det. 81
condensation in hypersonic nozzle 187
s impurity throughout metal samples 483
ormative time lags of spark breakdown 869

Nitrogen—*contd.*
  energy per ion pair 933, 4885
  l.p. discharge, Crookes dark space field 1664
  optical anisotropy, modified Silberstein model 1820
  3rd virial coeff. 2259
  slow electrons diffusion in 2508
  ion drift velocities 2514
  dissociation on W filaments 2779
  dissociation energy value 2788
  adsorbed, phase transitions 2796
    at high saturations on Al 8033
  sound absorpt., l.p. 3046
  refract. index at 9200 Mc/s 3455
    ions, bombardment of light nuclei 3575
    range/energy rel. in gases 6099, 6868
  intense drying with K 3705
  condensation nuclei production by u.v. light 3775*
  liquid, atomic distrib. curve study 3921
    compressibility, molec. radius, association, from sound velocity 4664
    vapour pressure 6712
    tensile strength 7479
  shock front shape and thickness 3945
  critical saturation problem in diving 4525
  spec. heat ratios, resonance method 4774
    ultrasonics meas. 7642
    under pressure 7643
  energy losses, protons 4874
    H, He, N, Ne ions 6868
  elec. conductivity at high press. and temp. 5471
  active, theories 5544
    airglow theory 6334
    afterglow mechanism 8614
  intermol. force constants 5618
  meas. of Joule–Thomson coeff. 6550
  Hartree–Fock wave functions, N II 7045
  ultrasonics, vel. meas. up to 1150 atmos. 7525
    oxidation by, in water 8029
  dry, continuous flushing of i.r. spectrophotometer 7552
  quadrupole resonance, spin-spin coupling 7824
  (n, H^3) cross-section meas., for H_3 production in atmosphere 7935
  H–N mixture, thermal diffusion 8270
  NO–N_2O_5 reaction, new data 8732
Nitrogen pentoxide
  decomp. rate theory 6281
Nitromethane
  thermal decomposition 3678
Nitrosyl chloride
  sensitizer in H–O reaction 2006
Nitrous oxide
  CO_2–N_2O, intermolec. potential 349
  spec. heat ratio, resonance method 4774
  decomp. rate theory 6281
  meas. of Joule–Thomson coeff. 6550
  CO_2–N_2O critical consts. 6715
Noise
  electrical see *Cosmic radiations, r.f.; Fluctuations, electrical; Sun, radiation, radiofrequency*
  acoustic
    measurements plotting 93
    unsolved basic research problems 714
    single bubble cavitation noise 715
    average level in street, calc. 717
    aircraft noise, surveys 718, 5356
      meteorological conditions influence 5341
      sources, phys. charac. 5357
      propellors, analysis and reduction 5362
      testing, control 5363–5
      control, materials and structures 5367
    steady-state, hearing damage risk 1314
    new types of ear protectors 1315
    hearing loss in industry 1316
    automatic noise, binaural tape recording 1475
    imitation of natural noises 2288
    propagation in continuous media, theory 3039
    ventilation system, meas. and prediction 3069–70
    in private motors cars 3072
    machinery, meas. and interpretation 3073
    jet engines, characteristics 5358–60
      testing, control 5363–5
    aerodyn. origin, classification 5361
    gas turbines, radiation pattern 5366

A complete list of the Subject Headings will be found at the end of the Index.

Noise abatement see also *Absorption, acoustic waves*
- architectural acoustics, recent progress 94
- noise-reducing piping components, eval. tech. 716
- aircraft noise, surveys 718, 5356
  - in cabins 3071
  - test-cell silencer, model tests 5355
  - propellor noise 5362
  - testing 5363–5
  - materials and structures problems 5367
- unsolved military noise problems 2301

Nomograms see also *Graphs*
- for functions of >3 variables 3788
- for tropospheric refract. index calc. 4520
- for blackbody radiancy, and Döppler line intensities 4680
  - and Lorentz line intensities 4681
- for Li^{6}(n, α)H^{3} data anal. 5829
- for anisotropic crystal refract. index calc. 6595
- γ-ray transitions, lifetime-energy-spin 7099
- 3-mass system, vibrations, solution 7514

Novae
- supernova, neutrino energy 3818
- origin of supernovae r.f. outbursts 7390
- supernovae r.f. radn. origin 7391

Nuclear decay schemes see *Radioactivity, decay schemes*

Nuclear decay theory see also *Nucleus, theory*
- amplitudes interference in cascade processes 394
- isomerism and shell structure, decay schemes 1022
- statistical fluctuations 1043
- Ti^{48} excited levels invest. by V^{48} and Sc^{48} decays 1051
- β-γ angular correl., heavy nuclei 1071
  - Tm^{170} 1884
  - Sb^{124} 8660
  - and ang. distrib., polarization, theory review 4314
- nuclr. radn. contrib. to β-activity continuous γ-spectrum 1073
- evaporative theory of disintegrations 1860
- γ-radn. lifetimes rel. to nucleon config. 1862
- Rb^{87} 1867
- double β-decay, stability against 1882
  - favourable cases for 5683
- time-free solutions method 2647
- nuclear isomer lifetimes for γ-transitions 2650
- RaD disintegration 2655
- nuclear stability rules (book) 4270
- AcK α-branching 4308
- β-ν correl., Fermi term 4315
- angular correlations, theory 4617
  - many-step cascade 5678
  - external field influence 7092
  - electron-neutrino, interference terms 7093
  - det. of interaction coupling terms 7095
- based on transitions of rotation levels 5670
- α-decay 7880
  - instability of rare earth nuclides 5680
  - electron cloud correction, energy-period rel. 5007
  - quantitative theory 5010
  - new theory 3557
  - *v.* spontaneous fission 1864
  - atomic electrons rôle 1874–5
  - spectra systematics 1876
  - in 82-neutron region 1877
  - in rare earths region, analysis 1062
- expected transition rate In^{114}, Sn^{114} 7882
- dipole transitions in light elements 8664
- β-decay, review 4979
  - for arbitrary order forbidden transitions 408–9
  - Fermi universal const. 1066
  - Fermi interactions 8661
  - heavy nuclei, β's, ang. distrib. 1070
  - 2 : 1 vector/tensor interaction 1080
  - spinor formulation 1385
  - finite nucleus effect 1887
  - once-forbidden spectra evidence 1888
  - and ΔL-forbidden transitions, meson theory 1889
  - interaction 1890
  - and isomeric transition, daughter atom elec. charge 1891
  - atomic excitation 1892
  - short-lived activity and nuclear isomerism 2662
  - cross-terms in 3558
  - theory of forbidden transitions 4311
  - allowed and forbidden decay 4312

Nuclear decay theory—*contd.*
- β-decay—*contd.*
  - mixed invariants, interference terms 4313
  - matrix element, radiative corrections 4316
  - pseudoscalar matrix element 4317
  - nucleon-lepton interaction, expt. evidence 50
  - and electron-capture, atomic electron effects
  - effect of finite de Broglie wavelength 5023
  - matrix elements, odd nuclei 5652
  - of mirror nuclei 5687
  - ditto, core/particle ang. mom. sharing 5688
  - pseudoscalar interaction 5863
  - and shell model 6166
  - new selection rule for certain disintegrations
  - and atomic electron binding energy 6205
  - over-allowed transitions 7036
  - in jj coupling, matrix elements 7094
  - nucleon isobar as intermediate state 7888
  - C^{14}, *v.* long lifetime 411
  - C^{10}, Fermi interaction 7885
  - Co^{60}, Sc^{46} spectra interpretation 7884
  - F^{20} 1879
  - He^{6} 412
  - O^{14}, Fermi interaction 6206, 7885
  - triton 1883

Nuclear emulsions see *Particle track photography; P graphic materials*

Nuclear excitation see also *Nucleus, energy levels*
- excited states prediction of nuclei round Pb^{208}
- by protons, functions up to 100 MeV, C^{12}, Na F^{18}, B^{11}, S^{34} 434
- compound nucleus, energy rel. to fission asymm 435
- Si^{28}, by α-particles on Mg^{24} 1105
- evidence for new Be^{7} level 1109
- oscillations, due to fast electrons 1902
- by inelastic scattering of fast neutrons 1918
- Li^{7}, 2nd state, excit. energy 2698
- Sr^{89}, Sr^{88}(d, p)Sr^{89} magnetic anal. 2699
- O, by fast neutrons 2746
- excitation functions in Li^{7} for (γ, p) and (γ, t)
- Fe^{56}, 0·83 MeV, by neutrons 4362
- even-even, excited states 5649
  - first-excited state 5650
  - patterns in α-spectra 8654
- de-excitation by positon-negaton pairs 5697
- by π^{-} meson absorption 7908
- heavy nuclei, by low-energy protons 8676

Nuclear fission
- asymmetry rel. to compound nucleus energy 43
- fission/capture cross-section ratio 1136
- Mn activation and U fission cross-sections meas. 1139
- U^{235}, quaternary, possibility 1141
- spontaneous, *v.* α-decay 1864*
  - Cf^{246}, rate 3547
  - Cm^{242} 7082
- activation energy, 30 nuclides (Ra^{226}–Cm^{242}) 1
- mechanism, simple theory 2725
- U^{232}, thermal neutron fission cross-section 272
- interpretation rel. to nuclear constitution 3522
- U^{238} photofission yield 3598
- asymmetry, liquid drop model 3607
- high-sensitivity thermal neutron counter 3622
- U, by neg. μ-meson capture 4341
- bibliography 4369
- photomesonic, of Bi 5075
- U cylinders, fission factor calc. 7156
- fissionable gas expansion as atomic power 7157
- U^{234} cross-section 7936
- ternary, with 3rd short-range fragment 8689
- **products**
  - Th photofission, ang. distrib. 447
  - radioactive waste, filter beds, efficiency 1098
  - Th^{232}, by p, yield curves 1108
  - neutrons, prompt, ang. distrib. 1140
    - Pu^{239}, spectrum 1142
    - U^{235}, spectrum 4371
    - long-lived delayed 7937
  - Br^{87}, yield 1873
  - fission fragments energy loss 1927–8
  - Ge^{77}, As^{77}, Ge^{78}, As^{78}, yields 2658

clear fission—*contd.*

roducts—*contd.*
- asymmetric fission, yield curve 2727
- Th^{232}, by *n*, radiochemical studies 2728
- storage of radioactive gases 2732
- Cs, Rb, Sr isotope yields 3608
- polystyrene decontamination from 4334
- U photofission yields 4357
- U, short-lived Ce isotopes 4370
- Th, photofission, radiochem. studies 5076
- Te^{134} yield 5088
- Xe^{135} independent yield 5089
- fission fragments, electron capture and loss 5090
- I^{131} yield in U^{235} fission 5091
- radioactive dust in atmosphere 5252
- delta rays, linear density 5529
- Co and Mn in Fe^{55} produced in pile 5709
- photo-neutrons in heavy water from 5710
- atomic explosion aerosol, path 7362–3
- As^{79}–Se^{79m} in slow neutron fission of U^{235} 7938
- Xe^{135}, poisoning of JEEP 7942

clear fission reactors
- Argonne CP–2, transfer function 460
- instrumentation, neutron detectors 1159, 4398
  - and operational equipment 7945
- thermal, automatic control charac. 1925–6, 4376–7
  - fissionable isotope prod. 6233
  - low-power for research 7158
- with reflectors, transient regime 2729
- "swimming pool," low cost reactor 2730
  - control system 4373
- pile-kinetic equations, appl. 2731
- divergent, relaxation time expts. 2733
- neutron sources, elementary theory 3609
- enhanced reactor 3610
- as neutron sources 4372
- U–graphite lattices 4374
- liq. reactant pile, heat transfer, turbulence effect 4375
- cylindrical, criticality 5092
  - one- and two-group theory 5093
- critical dimensions, calc. 5094–5, 7154
- meas. of abs. neutron density in GLEEP 5096
- multiplication factor meas. 5097
- design and applications, review 5098
- power-level, ionization chamber meas. 5536
- d.c. electromag. pumps for liq. metals transfer 5580
- theory, lecture notes 5711
- reactivity meas. apparatus 5712, 6234
- heavy water level meas., Saclay reactor 5713
- heavy water, delayed photoneutrons effect 7139
- neutron flux distrib., JEEP, calc. 7159
  - Kjeller U pile 7161
- neutron and γ-radiation round JEEP 7160
- JEEP reactivity, rel. to control plate posn. 7162
- Kjeller, first running-up 7163
- heavy water expansion, influence on reactivity 7164
- elements of theory (book) 7939
- inspection of rods in JEEP 7940
- general aspects of thermal breeding 7941
- JEEP, Xe^{135} poisoning 7942
- tech. advances, EBR, HRE, MTR systems 7943
- Argonne CP–3′ heavy water system 7944
- radiation safety precautions 7946
- coolants, data 7947
- neutron energy distrib. det., by B absorption 7961
- structural materials 8153
- heavy water, transitory conditions 8691
- power-producing reactors, survey 8692
- ceramics for refractories 8693
- Zr as structural material 8694
- neutron data need in design 8706

clear forces see also *Field theory*
- divergences due to 28
- relativ. 2-body problem, non-adiabatic treatment 38
- the exchange current 47
- and deuteron ground state 48
- meson theory 49
  - and neutron-proton interaction 621
  - higher order corrections 2202
- pseudoscalar meson theory 54, 3874
  - spin-orbit coupling 5303
  - radiative corrections 8237

Nuclear forces—*contd.*
- symmetric pseudoscalar theory 622, 3875
  - and Tamm–Dancoff formalism 5855
- 4th-order adiabatic nuclear potential 52
- fast nucleons exchange forces 617
- binding energies, H^3 and He^4 1029, 1832
  - He^4, calc., single-particle wave functions 6170
  - α-particle, effect of tensor forces 3519
  - neutrons and protons, light nuclei, discontinuities 375
  - ditto, survey 4960
  - Be^8, and α-particle model 1839
  - nuclei $A = 17$ to $A = 32$ 2613
  - wave functions calc. 6176
  - of last neutrons in U^{240}, Np^{240} 7874
  - He^5 and Li^6 8635
  - *jj*-coupling shell model 8636
- rel. to structure 1837
- Coulomb, and isotopic spin 2957
- advances in knowledge, review 2958
- tensor forces, energy matrix eval. 2959
  - effect on α-particle binding energy 3519
- general relativistic approach 3851
- charge independence 3876
  - effects on photonuclear reactions 7146
  - and repulsive core 8238
- theory, conf. 4337
- nucleons, several hundred MeV, with nucleons and nuclei 5301
- elementary review 5654
- noncentral force matrix elements, d^2 config. 6480
- discontinuities in nuclear mass surface 7034
- Schrödinger eqn. for Yukawa potentials 7450
- nucleon-nucleon, low-energy props. 7459
- Bethe–Weizäcker law, empirical modifications 7835
- v. high energy nucleon-nucleon collisions, meson prod. 7950
- many-particle systems: shell model 8637

scattering
- *p-d* and *d-p* scattering invest. 1690
- nucleon scatt. on nuclei, effective range 2195
- neutron-triton scatt., 14 MeV 3606
- proton-proton *s* and *p* waves, data analysis 6097
- comparison of D–T and D–He^3 cross-sections 7135
- in formal theory of scattering 7456
- anom. scatt. of μ-mesons in Pb 8703

Nuclear induction see *Nuclear magnetic resonance*

Nuclear isomer separation
- review of methods 3573
- Br^{80}, Tc^{99}, In^{113} 6900
- Szilard–Chalmers prep. As^{76} from (CH$_3$)$_2$AsOOH 7905

Nuclear isomers see *Nucleus, energy levels*

Nuclear magnetic resonance see also *Paramagnetic resonance absorption*
- electric quadrupole spectra in solids 381
- spin-spin relaxation in ferromag. resonance 953
- conductors, e.m. losses rel. to absorption 984
- "wiggles" or "beats" phenomenon 1749
- proton, and molec. motion, solids 1827
  - in liquid crystals 3435
  - sorbed water, line width 4912
  - cetyl alcohol 6138
  - 4 proton system in K$_2$HgCl$_4$.H$_2$O single crystal 379*
- microwave freq. stabilization, atomic clocks 2162
- intensities in cubic crystals 2549
- multiplets in liquids 2617
- B^{10}, N^{14}, Cl$^{35, 37}$, As^{75}, In$^{113, 115}$, Bi^{209} 2618
- nuclear induction, dynamical theory 2619
- excited atomic levels detection 2624
- Al^{27}, line width transition 3432
  - line splitting in LiAl(SiO$_3$)$_2$ 6948
- aligned radioactive nuclei 3436
- solid methane states information 3474, 4239
- solid *cyclo*hexane invest. 4267
- review article 4287
- mag. field distrib. study appl. 4900
- in solids and liquids, review 5385
- static magnetic fields invest. 5563
- Se^{77} 5657
- nuclear resonance spectrometer 5658
- K$_2$HgCl$_4$.H$_2$O and K$_2$SnCl$_4$.H$_2$O single crystals 6139–40

- **Nuclear magnetic resonance**—*contd.*
  - relaxation, in viscous liquids 6141
    - in crystalline solids 8771
  - in $LaMnO_3$, low temp. 6940
  - 2nd-order quadrupole effects in single crystals 6947
  - of 3 solid benzenes 6985
  - in antiferromag. single cryst. 6939
  - spin-medium broadening in quadrupole resonance 7037
  - $CuCl_2.2H_2O$, $K_2CuCl_4.2H_2O$, $(NH_4)_2CuCl_4.2H_2O$ 7038
  - Cl^{35}, in various solids 7040
  - in Tl compds. 7041
  - $S^{33,35}$ quadrupole moments det. 7042
  - field gradient meas., induction method 7786
  - Rb^{87} and Cs^{133} shifts in solid halides 7795
  - in solid H 7796
  - N quadrupole, spin-spin coupling 7824
  - $Fe(NO_3)_2.9H_2O$, absorption; and theory 7839
  - 2nd moment, modulation correction for 7840
    - separation of intra- and intermolec. contrib. 6161
  - dipolar broadening, quadrupole reson. line width 7841
  - evidence for NaF dimerization 8039
  - N^{14}, chemical shift 8565
  - phenomena in ferrites 8570
  - circuit for detector amplitude stabilization 8585
  - B^{11} quadrupole reson. freq. in BO_3''' 8620
  - Br in molecular solids 8621
  - optically induced nuclear magnetization 8632
  - apparatus and procedures 8633
- **Nuclear photo-effect** see *Nuclear reactions, photons*
- **Nuclear reactions** see also *Nuclear excitation; Nuclear fission; Nuclear spallation; Radioactivity; Thermonuclear reactions*
  - Univ. of Pittsburgh scattering project 270
  - charge symmetry effect 612
  - high-energy disintegrations, shower component, plural theories 944
  - mass det. from disintegration energies, O to S 1042*
  - Li^6 targets preparation 1101
  - *T*-tracks in emulsions, study 1102
  - high-energy nucleons with nuclei 1106
  - cross-sections formulae 1110
  - star distrib., emulsions, statist. study 1734
  - coupling of angular momenta 2684
  - polarized particles production 3580, 5864
    - in $a + X \rightarrow Y + b$, theory 7122
  - magnetic spectrometer energies det. 3589
  - theoretical nuclear physics (book) 4335
  - theory of angular correlations 4617
  - higher spin polarizations 5054
  - angular meas. by ionization chamber 5537
  - in nature, origin of A^{38} in pitchblende minerals? 6193
  - γ-ray ang. distrib. from stripping reactions 6210
  - pump target assembly for cyclotron bombard. 7119
  - "jets" in photog. emulsions 7120
  - geometry of angular distribution 7121
  - cross-sections for inelastic scattering 7123
  - resonance, poles of *S*-matrix 7460
  - and charge independence 8640
  - due to N ion bombardment, Al 8673
    - light nuclei 3575
  - **chemical effects** see also *Chemical effects of radiations*
    - ethyl bromide and iodide dissoc. by neutron capture 1223
    - Szilard–Chalmers process, review 1861
    - radioactive ions of Br, Tc, In 6900
- **Nuclear reactions due to**
  - **alpha rays**
    - barrier penetration effects, light nuclei 1903
    - C, π^+/π^- ratio 2686
    - cross-section for compd. nucleus formn. 4344
    - H^1 to C^{14} secondary particle yield from Be, Al, Ni, Ag, Au, U bombard. 5057
    - Ag^{109} (α, n) and $(\alpha, 2n)$ cross-sections 5056
    - $Al^{27}(\alpha, \alpha 2pn)Na^{24}$, cross-section, threshold to 380 MeV 7125
    - Be and B bombard., γ-ray resonance 4346
    - $Be^9(\alpha, n)C^{12}$, C^{12} energy levels det. 7076
    - $He^4(\alpha, n)Be^7$, search for 1104
    - $Li^7(\alpha, \gamma)B^{11}$ and B^{11} states 429
    - $Mg(\alpha, n)Si$ processes, excitation function det. 7124
    - $N^{14}(\alpha, p)O^{17}$, *Q* values 4345
- **Nuclear reactions due to**—*contd.*
  - **cosmic rays** see also *Cosmic rays, effects*
    - α-particle emission, energy distrib. 946
    - neutron production, in Pb 3418
      - in elements, rel. to lat. and alt. 4191
    - due to secondary shower particles 4198
    - high-energy heavy fragment occurrence 5055
    - high-energy, in Pb and light elements 6127
    - μ^--mesons capt. by Fe, max. energy of neut produced 6220
    - slow π-, and neg./pos. ratio, in emulsions 6922
    - interactions by relativistic μ-mesons 7753
    - induced by primary protons in high atmos. 7780
    - growth of a jet in a nucleus 7783
    - explosions, $H^1 : H^2$, $He^3 : He^4 : He^6$ ratios 7907
    - in emulsions, ang. correl. of products 8671
  - **deuterons**
    - stripping reactions, radiations angular correl. 11
      - ang. distrib., inform. on compound nucleus 1
      - theory 2696, 3585
      - γ-ray ang. distrib. 2695
      - (d, p) reaction, Al 3592
      - (d, p) reaction, Mg isotopes 3593
    - $(d, p\text{–}\gamma)$, ang. correl. 1121
    - (d, t), theory 1910
      - stripping and pick-up differential cross-secti 442
    - cross-sections for compd. nucleus formn. 4344
    - (d, n) reactions, ang. distrib., Coulomb field influe 5061
    - (d, p) and (d, n), theory 7922
      - polarization 7128
      - Born approximation theory 441
    - $Al^{27}(d, p)Al^{28}$ 1113, 1123
    - $Al(d, p)$ stripping reactions 3592
    - $Al^{27}(d, \alpha p)Na^{24}$, excit. function 7923
    - B^{10}, α-particles study 4350
    - $B^{10}(d, \alpha)2\alpha$, mech. 7921
    - $B^{11}(d, n)C^{12}$, photographic method study 4353
    - B^{11}, Be^9, $Li^{6,7}$, N^{15} energy values 3590
    - Be, magnetic analysis 2698
    - Be^9 bombardment and B^{10} levels classification 4
    - Be^9, protons and tritons ang. distrib. 1122, 3583
    - $Be^9(d, t)Be^8$, low-energy, ang. distrib. 4354
    - Be, neutron groups 4351
    - Be, C, U, 190 MeV bomb., high-energy charg particles 5065
    - $Be^9(d, n)Be^{10}$, stripping 8682
    - $C^{13}(d, n)$, $C^{13}(d, p)$, $C^{12}(d, p)$ mag. lens spectrome study 1112
    - $C^{13}(d, n)N^{14}$, ground-state parity invest. 1119
    - $C^{12}(d, n)$, neutron groups 3586
    - Ca^{40},(d, p) stripping 7127
    - $Cl^{35}(d, p)Cl^{36}$, protons ang. distrib., shell mo evidence 376
    - $Co^{59}(d, p)Fe^{59}$, production techniques 427
    - D + D, neutrons ang. distrib. 1911
      - spin orbit coupling 2694
      - products ang. distrib. 3581
      - below 50 keV, cross-section and ang. distri 3582
      - cross-section and ang. distrib., 55–430 keV 3588
      - polarization of *p* and *n*, theory 7133
    - $D(d, p)H^3$, cross-section and ang. distrib. 1124, 27
    - D–H^3 and D–He^3, below 45 keV 4352
      - low-energy comparison 7135
    - $F^{19}(d, p)F^{20}$ and $F^{19}(d, \alpha)O^{17}$, magnetic anal. 1914
    - $F^{19}(d, p)F^{20}$ ang. distrib. 2697
    - $H^3(d, n)He^4$, 10 keV to 1732 keV 1116
      - α-particles ang. distrib. 440
    - $He^3(d, p)He^4$, cross-section and ang. distrib. 11 4355
    - $Li^6(d, n)$, $Li^6(d, p)$ mag. lens spectrometer study 11
    - $Li^6(d, p)Li^{7*}\gamma Li^7$, *p* and γ ang. correl. 3594
    - $Li^7(d, n)Be^8$, neutrons ang. distrib. 1913
    - $Li^7(d, \alpha)He^5$, evidence for He^5 excited state 5062
    - $Mg^{24}(d, n)$, Al^{25} energy levels det. 2701
    - $Mg(d, p)$ stripping reactions 3593
    - $N^{14}(d, n)O^{15}$, at 8 MeV deuteron energy 3587
    - $Na^{23}(d, p)Na^{24}$, protons energy and ang. distr 1120, 8683
    - $Ne^{20}(d, \alpha)F^{18}$, energy by magnetic anal. 7134
    - $Ne^{21}(d, \alpha)F^{19}$ and $Ne^{21}(d, p)Ne^{22}$, energies 1912

clear reactions due to—*contd.*
- **euterons**—*contd.*
  - $O^{16}(d, \alpha)N^{14}$, $O^{16}(d, \alpha)N^{14*}$, e.s. analysis 1111
  - $O^{16}(d, p)O^{17}$ mag. lens spectrometer study 1112
  - $O^{16}(d, n)$ neutron groups 3586
  - $Pb^{206-8}(d, p/t)$ 2700
  - $S^{32}(d, n)$ neutron groups 3586
  - S^{32}, (d, p) stripping 7126
  - S^{33} and Si^{29} states from (d, p) stripping 3591
  - $Si^{28}(d, p)$ stripping 7126
  - $Sr^{88}(d, p)Sr^{89}$, magnetic anal. 2699
  - $Sr^{88}(d, p)$ stripping 7127
  - Ti^{47-51} levels from $Ti(d, p)Ti$ 1836
  - $V^{51}(d, p)V^{52}$, p ang. distrib. 3595
  - $Zn^{64}(d, \alpha n)Cu^{61}$ 5064
- **lectrons**
  - dipole oscillations excited by fast electrons 1902
- **amma rays** see *Nuclear reactions, photons*
- **elium-3**
  - artificial activity in C 431
  - in nuclear emulsions 4342
  - 21 MeV, on Be, C, O, Ni 4343
  - 21 MeV cyclotron bombardment 5066
  - $Cu^{65}(He^3, \alpha)$, inverse Oppenheimer–Phillips 7911
  - $Li^6(He^3, p)Be^8$, Be^8 energy levels 7912
  - $He^3(He^3, p)Li^5$ and $T(He^3, p)He^5$ 8674
- **esons** see also *Cosmic rays, effects*
  - 30–75 MeV brought to rest in Pb, Sn, Al, C, neutron emission 470
  - disintegrations by slow neg. μ-mesons 2685
  - capture by C, radiation emitted 5694
  - μ-capture by Fe, max. n energy 6220
  - μ^-, at rest in Pb, Bi, Sn and Al, neutron multiplicity 6221
  - meson-nucleon scatt., phase shift sign 6222
  - μ^--meson capture, neutrino emission 6223
  - neutrons from μ-mesons stopped in Pb 6927
  - relativistic μ-mesons 7753
  - electron pair prod. by π^-, in nuclear collisions 7909
  - emulsion stars, light elements 7910
  - π mesons ($\sim$100 MeV) on nucleons and nuclei, survey 8672
  - μ^- capture in emulsions 8696
  - μ^--mesons from cyclotron, in emulsions 8697
- **eutrons** see also *Nuclear fission; Neutrons, absorption*
  - total cross-sections, Pb, 37–156 MeV 453
    - 21 elements, 14 MeV 1135
    - Co, Ag, I, Al, Ni, Ga, 1 eV to 5 keV 1919
    - Na 1921
    - Be, Na, Mo, Hg 2720
    - Au, Cl, P 5084
    - Cl, Na, Ti, Br 5085
    - Cl and C 7152
  - chain reacting systems theory, review 459
  - capture γ-rays, $Z = 17$–30, 45–57 1086
    - Be, C 1893
    - Ti, Cr, Fe, Ni, Zn 2670
    - Sc, V, Mn, Co, Cu 2671
    - Cd^{113}, Co^{59}, Cl^{35} 7106
  - fission/capture cross-section ratio 1136
  - nuclear reactor as research implement 1138
  - fast cross-sections meas. methods 1152
  - emulsion irradiation, with accompanying γ-radiation, development 2131
  - thermal capture cross-section, Sr^{84} 2718
    - for Sc^{46} and Sr^{85} prod. 5080
    - H 5083
    - Na^{23}, Mn^{55} 5086
    - Em^{222} 7150
  - cross-sections, Cu, S, Al, O, P, Bi, 14 MeV 2719
    - 57 elements, 14·5 MeV 2723
    - average H, Be, C, O, Al, Si, S, Fe, Cu, Zr, Pb, Bi, U, 3 to 12 MeV 2724
    - Co, Ga, Se, Cd, Te, Pt, Au, Hg, Th, fast 4366
    - for all products of 90 MeV on C 4368
    - H, C, Cu, Cd, Pb, Th, U, 400 MeV 5082
    - in MeV region, theory and meas. (conf. rep.) 7149
    - energy dependence, theory 7934
  - π^0 meson prod. in n–p collisions 3621
  - inelastic scattering in Fe 4362
    - in Cd^{111} 4363, 7123
    - with γ-radiation, directional correl. 417–18
  - $n + p \rightarrow d + \gamma$, γ-ray spectrum 5035, 8684

Nuclear reactions due to—*contd.*
- **neutrons**—*contd.*
  - (n, γ) and $(n, 2n)$ in I 5078
  - activation cross-sections measured with Sb–Be photoneutrons 5079
  - compound nucleus formation 5081
  - ang. distrib. of particles from stars 5087
  - capture, infl. of nucleonic orbits 7148
  - 2·7 MeV, γ-radiation 8687
  - multiple pion prod. in cosmotron n–p collisions 8688
  - $(n, 2n)$ for $Cu^{63, 65}$, $Ag^{107, 109}$, (n, p) for Al^{27}, P^{31}, Fe^{56}, Cu^{65}, (n, α) for Al^{27}, activation cross-sections 1920*
  - 14 MeV on Li and Be, He^6 formation 1922
  - $B^{10}(n, \alpha)Li^7$, use in B detect., B steels 2129
    - invest. with B trimethyl 3600
  - Bi, absorption cross-sections for pile neutrons 7153
  - $(n, 2n)$ in C^{12}, Cu^{63}, Mo^{92} 1134
  - neutron activation of Ca^{46} 6232
  - $Cl^{35}(n, \alpha)$ cross-section and Q value 8685
  - Cu^{68} from Zn and Ga 7064
  - high-energy, Cu spallation 461
  - $D(n, 2n)H^1$, evidence 7185
  - Fe^{59} prod. by $Co^{59}(n, p)$ 3603
  - 14 MeV, on Fe, γ-radiation 4365
  - $Fe(n, \alpha)$ and $Fe(n, p)$ 5077
  - $Fe(n, \alpha)Cr$, non-observation with thermal neutrons 5708
  - H thermal neutron capture cross-section 7186*
  - 90 MeV, He disintegration 2722
  - $Li^6(n, \alpha)H^3$, data analysis nomograms 5829
    - ang. distrib. for 200, 270, 400, 600 keV 6231
  - $Mo^{92}(n, 2n)Mo^{91}$, isomeric branching and threshold 3605
  - (n, H^3) cross-section meas. in N 7935
  - (n, d), by slow neutrons on Zn isotopes and Ni 452
  - P^{33} prod. with thermal neutrons 1132
  - n scatt. by Pb^{204}, ang. distrib. geom. 7121
  - Pd^{102} activation cross-section 5005
- **photons**
  - high-energy photoelectric reaction 443
  - photofission, Th, fragments ang. distrib. 447
    - U, yields 3598, 4357
    - Th, rel. yields, radiochem. det. 5076
    - B^{10}, B^{11} 7136
  - meson production, in deuterium 448–9, 1146
    - pseudoscalar theory 630
    - excitation function 2710
    - ang. and energy distrib. 2713, 5703
    - in complex nuclei 2714
    - damping corrections 3618
    - excitation curve for Be 6227
    - photostar computation 7145
    - by photon passage through matter 7165
  - neutral meson production, in H 1916–17, 2712, 2715
    - in D 1917, 2715, 5721
  - charged meson production, in H and D 1148
    - in He, H/He ratios 7955
    - in nuclei, pos./neg. ratio 451
  - pos. photomesons from H at 0° 8701
  - double meson photoproduction 5719
  - high-energy X-rays, absorpt. cross-sections 1089
  - Breit–Wigner formula appl. 1126
  - high-energy photoprocesses, background effects 1127
  - photodisintegration, energy-temp. rel. invest. 2685
  - high-energy photoproton prod., 322 MeV bremsstrahlung 2705
  - deuteron photodisintegration 3596, 4359, 7140
    - high energies 1128
    - 100 MeV, repulsive core limit 1915
    - energy and angle distrib. 2704, 7932
    - π-mesons prod. 5100
  - "photon difference method" resolution 4358
  - energy absorption, human tissue 4524
  - identif. of $(\gamma, p\alpha)$ reactions in nuc. emulsions 5068
  - absorption and m.f.p. in nuclear matter 5702
  - photodisintegration, survey 5705–6
  - photo-neutrons, in heavy water from U fission products 5710
    - cross-sections rel. to betatron energy 7930
    - excitation functions to 320 MeV 7931
  - 0·5 MeV polarized photon photoelectron prod., distrib. 6229

Nuclear reactions due to—*contd.*
- **photons**—*contd.*
  - cross-section curve derivation 7141
  - photo-alpha reactions in emulsions 7142
  - consequences of charge independence 7146
  - dipole photonuclear reactions and independent particle model 7929
  - Ag(γ, α) 2663, 7925
  - B^{11} and B^{10}, (γ, α) reaction 5072
  - Be^{9}(γ, p) threshold 445
  - Be^{9}(γ, p)Li^{8}, cross-section 2706
  - Be, high energies 5071
  - Be cross-section, 2·185 MeV 6230
  - Bi absorption cross-section 1125
  - Bi photomesonic fission 5075
  - Br^{81}(γ, n)Br^{80} 7137
  - Br$^{79,\,81}$(γ, α) 446, 5704
  - Br(γ, α) 2663, 7925
  - C^{12}(γ, α) in photo emulsions 7147
  - C^{12}(γ, 3α), cross-section 2716, 5067, 5074
  - C^{12}(γ, 3α) abs. cross-section 5069
  - C^{12}(γ, 3α), α-emitting levels of Be^{8} 8657
  - C^{13}(p, n)N^{13}, N^{14} level struct. det. 5060
  - Ca(γ, n) cross-sections 2708
  - Ca^{40} 6228
  - Cu^{63}(γ, n) absolute cross-sections 5069
  - Cu^{63}(γ, n), multiple resonances 7927
  - In^{115}(γ, γ')In^{115*}, In^{115}(γ, 2n)In^{113*}, high-energy 4360
  - Li^{6}(γ, d)He^{4} 5070
    - 2·76 MeV 450
    - forbidden nature up to 17·6 MeV 3597
  - Li^{7}(γ, p) and (γ, t) excit. functions 4356
  - Li^{7}(γ, α) processes 5704
  - Li^{7}(γ, t)He^{4}, cross-sections at 6·13, 14·8, 17·6 MeV 7928
  - Mo$^{92,\,100}$(γ, p) yield, energy, distrib. 7144
  - Mo^{92}(γ, n) cross-sections 7144
  - O^{16}(γ, 4α), resonances 444
    - cross-sections 2716, 5067
    - mechanism 5707
  - O^{16}(γ, α) processes 5704, 7147
  - O^{16}(γ, n)O^{15} and O^{18}(γ, p)N^{17}, cross-sections 7143
  - P(γ, pn) 1129
  - Rb^{87}(γ, n) cross-sections 7138
  - Rh^{103} inelastic scatt. 5073
  - Si (γ, n) cross-sections 2708
  - Ta absorption cross-sections 1125
  - Ta(γ, 2n) 2707
  - Ta^{181}(γ, 2n)Ta^{179}, cross-section, 17·6 MeV 2709, 7926
  - Ta^{181} excitation by bremsstrahlung 5693
  - U^{238}(γ, n)U^{237} yields 3598
  - Zr^{90}(γ, n) cross-sections 7138
- **protons**
  - fission asymmetry rel. to compd. nucleus excitation energy 435
  - meson production from light and heavy nuclei, multiplicity 473
  - proton-triton interaction 912
  - barrier penetration effects, light nuclei 1903
  - charged π-meson prod. in H, D, C, Cu, Pb 1147, 1908
  - 345 to 380 MeV, charged π-meson prod. in H and C 1909
  - (p, γ) resonances below 500 keV 2687
  - resonant electron capture from H 3578
  - (p, n), polarized particles production 3580
  - (p, π^0), yield rel. to A 3620
  - cross-sections for compd. nucleus formn. 4344
  - proton-proton, detonation 4347
    - Sun's energy prod. 2691
  - 130 MeV, cross-sections for star prod., emulsions 4348
  - 450 MeV, V^0 particles search 4389
  - p-capture, ang. correl. of subsequent cascade 5678
  - rel. excitation of isomeric and ground states 7129
  - resonance ½-widths calc. 7132
  - 160 MeV on Al, Be, C, U, n yields and spectra 7914
  - $\pi^+ + p \rightarrow n + \pi^+ + \pi^-$ cross-section 7952
  - 341 MeV, on protons, π^+ prod. 7954
  - heavy nuclei excitation by low-energy protons 8676

Nuclear reactions due to—*contd.*
- **protons**—*contd.*
  - 408 MeV, total cross-sections for H and li elements 8677
  - 50–125 MeV protons, disintegrations in pho graphic emulsions 8680
  - Ag, Al pion production ratio 7170
  - Ag, Au, 1·7–3 MeV, X-ray prod. 7920
  - Al(p, γ) 2672
  - Al^{27}(p, γ) and (p, p') 2693
  - Al, radiative capture, resonances $<$ 500 keV 4349
  - Al, 95 MeV 5059
  - Al^{27}(p, α)Mg^{24}, Al^{27}(p, γ)Si^{28}, excitation curves 86
  - B^{11}(p, n) excitation functions 434
  - B^{10}(p, He^{3}), (p, α), (p, p') 1111–12
  - B^{11} energy values 3590
  - B radiative capture, resonances $<$ 500 keV 4349
  - B^{11}, γ-radn. study 7898
  - B^{11}, C^{12} excited states interference 7899
  - B^{11}, α-radn. study 7917
  - Be radiative capture, resonant energies det. 432
  - Be, 245 and 375 MeV, n energies 433, 2692
  - Be^{9} inelastic scattering 1834
  - Be, 330 MeV disintegration products 1906
  - Be neutron spectra 3579
  - Be^{9} energy values 3590
  - Be, 95 MeV 5059
  - Be^{9}(p, α)Be^{8}, ang. distrib. of d 5701
  - Be pion production ratio 7170
  - Be, 6·59 MeV, neutron prod. study 7915
  - Bi, 430 MeV, pion prod. cross-section 1147
  - C^{12}(p, pn) excitation function 434, 1107
  - C, 245 and 375 MeV, n-energies 433, 2692
  - C^{12} inelastic scattering 1834
  - C, 330 MeV, disintegration products 1906
  - C, π^+/π^- ratio 2686
  - C^{12}(p, p)C^{12} differential cross-section 2688
  - C^{12}(p, $p'\gamma$), γ-rays ang. distrib. 2690
  - C, radiative capture, resonances $<$ 500 keV 4349
  - C^{13}(p, γ)N^{14}, energy levels det. 5058
  - C, Cu, D, 95 MeV 5059
  - C; Cu pion production ratio 7170
  - high-energy, interactions with C 5700
  - prod. of Co^{54}, Mn^{50}, V^{46} 7068
  - Co, Mn, V spallation products 8681
  - Cu proton reactions 436, 7918
  - D, π^+- to π^--production ratio 1938–9
  - F^{18} excitation function 434
  - F^{19}(p, $\alpha\gamma$)O^{16}, ang. correl. 1110
  - F^{19} inelastic scattering 1834
  - F, Li^{7} p–γ resonances, abs. det. 2687
  - F radiative capture 3577, 4349
  - He, 32 MeV, inelastic events 2689
  - on I, Xe$^{121,\,122,\,123}$ spallation products 1061
  - Li, 95 MeV 5059
  - Li^{7}(p, α)He^{4}, α-particles ang. distrib. 430
  - Li^{7}(p, n)Be^{7}, evidence for new Be^{7} level 1109
  - Li, 375 MeV, neutron energy distrib. 2692
  - Li$^{6,\,7}$ energy values 3590
  - Li^{7}(p, γ)Be^{8}, γ-ray meas. 7913
  - elastic scatt. in Li^{7}(p, p) 7919
  - Li^{7}(p, γ)Be^{8}(α)He^{4}, γ-ray spectrum 8679
  - capt. γ-rays from Li^{7}(p, γ), 4·40 keV reson. 7891
  - Mg$^{24-6}$, Mn^{55} 1835, 5672
  - Mg resonant capture, resonance $<$ 500 keV 4349
  - Mo, Ta, Pb, 1·7–3 MeV, X-ray prod. 7920
  - N^{14}, O^{16} inelastic scattering 1834
  - N^{15}, energy values 3590
  - N^{15}(p, α)C^{12}, magnetic lens spectrometer study 11
  - N^{15}(p, $\alpha\gamma$)C^{12}, α–γ ang. distrib. 1907, 3576, 7130
  - Na$^{22,\,24}$ excitation functions 434
  - Na, Mg, bombard., nuclear γ-ray prod. 2672
  - Na, Mg, (p, α), (p, p') 2693
  - Na^{23}(p, $\alpha\gamma$)Ne^{20}, ang. correl. 8675
  - Nb^{93}(p, n)Mo^{93} 1060
  - O^{18}(p, α) 7131, 7916
  - Pb, 95 and 245 MeV 433, 5059
  - Pb pion production ratio 7170
  - on Rb, neutron-deficient Sr isotopes prod. 1057
  - S^{32} inelastic scattering 1834
  - S$^{32,\,34}$(p, n) 434, 5672
  - Si^{28}(p, n) 5672

Nuclear reactions due to—*contd.*
- **protons**—*contd.*
  - $Si^{30}(p, 3p)Mg^{28}$ 4997
  - $T(p, n)He^3$, $T(p, \gamma)He^4$ 6226
  - $Tb^{159}(p, 3n)Dy^{157}$ threshold 5679
  - fission of Th^{232}, yield curves 1108
  - V^{51} 1835
  - $Zn(p)$ reactions, 100 MeV Goldberger model 436
- **tritons**
  - (t, d), stripping and pick-up differential cross-sections 442
  - 6·7 MeV cyclotron bombardments 5066
  - in emulsions, Li-loaded 7924
- **X-rays** see *Nuclear reactions, photons*

Nuclear reactors see *Nuclear fission reactors*

Nuclear spallation
- Cu, by high-energy neutrons 461
- of I, with 240 MeV protons, 3 new Xe isotopes 1061
- He, by 90 MeV neutrons, fragments study 2722
- by protons on Cs, $Ba^{128, 129}$ and Cs^{128} (neutron-deficient) 7869
- Cl, new nuclides produced 7876
- V, Mn and Co, products 8681

Nuclear track photography see *Particle track photography*

Nuclear transmutation see *Nuclear reactions*

Nucleus see also *Elements, origin; Radioactivity; Scattering, particles*
- 4th-order nuclear potential 50
- models, proton scattering invest. 273
- α-energy systematics and proton shells, heavier nuclei 373
- mirror nuclei radii 377
- *V*-particles and nuclear phenomena 467
- shell structure, and isomerism 1022
  - discussion 1024
  - evidence from Cs, Ru, Sr fission yields 3608
  - new parameter for discussion 5651
- stripping and the shell model 1027
- heavy, nonadditivity of nucleon moments 1033
- nuclear mass det. from disint. energies 1042*
- neutron energy for first resonance, rel. to absorpt. cross-sections 1131
- radius increase, rel. to isotope shift between RaD and Pb isotopes 1499
- tables of structure 1831
- alignment, of $Co^{58, 60}$ 1841, 5653
  - low temp., population distrib. 5034
- nuclear resonance modulation correction 1844
- radioactive props. rel. to molecule chem. struct. 1863
- light, barrier penetration effects 1903
- angular momenta coupling in nuclear reactions 2684
- spin-orbit coupling in *d-d* reaction 2694
- neutron scatt. by bound protons and deuterons 2743
- α-emitting, radii rel. to neutron excess 3520
- size effect on γ-ray int. conv. 3566
- nuclear isomer identification methods 3573
- stability rules (book) 4270
- $Z < 50$, closed proton shells 4271
- nuclear spectroscopy formulae 4277
- theoretical nuclear physics (book) 4335
- high freq. techniques, review 4707
- pairing properties of nuclear interactions 4957
- stable isobars with odd mass number, nonexistence 4959
- isomer lifetime, chem. state influence 4985
- $In^{110, 112}$, isomerism 4996
- transparency to fast neutrons 5725
- new selection rule for certain β-disintegrations 6167
- structure rel. to periodic system 6186–7
- fast positron scattering, nuclear size 6846
- dilatation oscillations 7026
- isomerism, experimental study 7063
- cosmic ray cascade, invest. 7783
- γ-absorption cross-sections, theory rel. to nucleus 7926
- motion invest. by electron diffraction 8449
- optically induced nuclear magnetization 8632
- binding energies, He^5 and Li^6 8635
  - H^3 and He^4 1832, 3519
  - *n* and *p* in light nuclei, discontinuities 375
- structure, effect on He h.f.s. 8642

Nucleus—*contd.*
- **electric moment** see also *Molecules, nuclear coupling*
  - determination from radiospectra 1840
  - quadrupole, odd-mass nuclei in *jj*-coupling 1842
    - pseudo-, effect in molecules 2598
    - reson. in metal chlorides and oxychlorides 4005
    - spectroscopic detmn. 7043
    - effect on γ-γ angular correl. 7111
    - Al^{27}, interaction in spodumene, 2nd-order effects 1845
    - B^{10}/B^{11} ratio in trialkyls 4949, 7005
    - B^{11} reson. freq. in BO_3''' 8620
    - Bi^{209} in Bi triphenyl 4952
    - $Cu^{63, 65}$ 6142
    - Er^{167} 378
    - I^{129}, I^{127} ratio, from pure quadrupole spectra 4966
    - Li^7 4965
    - Pd^{105} 5659
    - Pr^{141} 7829
    - $S^{33, 35}$, from resonance data 7042
    - Ta^{181} 1034
    - radioTh, influence on α-γ ang. correl. 5011
- **energy levels** see also *Radioactivity, decay schemes*
  - β-decay theory for arbitrary order forbidden transitions 408–9
  - zero-zero transitions 420
  - *A* levels (first excited states), regularities 1026
  - nuclr. radn. contrib. to β-activity continuous γ-spectrum 1073
  - *jj* coupling studies 1833
    - light nuclei states 1028
    - the $g_{9/2}$-shell 2609
    - excited states 4274
  - elec. quadrupole type isomeric transitions, interpret. 2668
  - $E3 + M4$ mixture in isomeric transition 2669
  - outer levels, energy shift calc. 3518
  - some *P*-shell nuclei in intermed. coupling 4272
  - isomers, classification 4276
    - systematics of levels 1022
    - lifetimes for γ-transitions 2650
    - short-lived, search 4307
  - vibration-rotation spectra dipole/quadrupole lines rel. 5040
  - matrix elements of β-transitions, odd nuclei 5652
  - rotation levels, naturally radioact. nuclei 5670
  - and structure of light nuclei, review 6169
  - shell structure 6178
    - and nuclear space 1031–2
  - even-even nuclei, rotational states 6212
    - excited states 4275, 4962, 5650, 6173–4
    - and odd-odd, level densities ratio 7918
    - α-ray spectra patterns 8654*
  - formula for energies of excitation 7031
  - heavy nucleus, level density calc. 7831
  - excited states, anal. by shell model 7832
    - nuclei near Pb^{208}, prediction 374
    - 2^+ first, heavy even-even nuclei 4273
    - even-even nuclei 4275, 4962, 5650, 6173–4
    - energies, preferred ratios 7035
  - dipole transitions, radiative width 8664
  - nuclides from He^5 to Ne, review 2604
  - Al^{25}, from $Mg^{24}(d, n)Al^{25}$ 2701
  - Al^{28} 1113
  - $B^{10, 11}$ 372, 429, 4351
  - B^{10}, classification from $Be^9(d, n)B^{10}$ 439
  - B^{11}, proton bombarded, α-radn. study 7917
    - ditto, γ-radn. study 7898
  - Be nuclear photo-effect, high energies 5071
  - Be^7, new level 1109
  - Be^8 excitation energy 372
  - Be^8 1st excited state, props. 4350
  - Be^8, from B photofission 7136
  - Be^8, from $Li^6(He^3, p)Be^8$ 7912
  - Be^8 α-emission levels 8657
  - Be^9 1834
  - Be^9, from *d*–Be reactions magnetic anal. 2698
  - Be^9, 2·37 ± 0·4 MeV excited state 7915
  - Bi, shell structure data 2700
  - C^{12} 1834
  - $C^{11, 13}$ excitation energies 372
  - C^{12}, from $Be^9(\alpha, n)C^{12}$ 7076
  - C^{12} excited states interference invest. 7899

Nucleus—*contd.*
energy levels—*contd.*
C^{12} by elastic α-scattering 6225
C^{13} and N^{13} mirror nuclei, anal. 1030
C^{14} from $C^{13}(d)$ 5063
Cd^{111}, continuum theory inelastic scattering appl. 418
Cl^{33} 3586
Cr 1835
Cs^{131} 7079
Dy^{161} spins and parities 1054
Eu^{153} spins and parities 1054
$F^{17, 19}$ 1834, 3586
F^{20} by deuteron reactions, mag. anal. 1914
Fe^{59} 1870
He, proton and neutron scatt. study 1689
He, inelastic events induced by 32 MeV protons 2689
He^5 excited state, evidence from $Li^7(d, \alpha)He^5$ 5062
Hg^{198} 6197
Hg^{198}, spin and parity of 1·09 MeV level 5030
In^{114} 2nd β-transition upper limit 7882
Ir^{192} 1084
$Li^{6, 7}$, transitions to ground and excited states 5072
Li^7 1st excited state data 3594
Li^7, excitation energies 372
Li^8, β-decay data 7091
Mg and Mn 1835
Mo^{93m}, "core isomerism" 4281
Mo 6·7 hr. isomeric transition assignment to Mo^{93} 3544
Mo^{95} 5000
N^{13}, C^{13} mirror nuclei, anal. 1030
N^{13} excited states invest. 2611
N^{13} from $C^{12}(d, n)$ 3586
N^{14} ground state 1119, 2610
N^{14} by inel. proton scattering 1834
N^{14}, from $C^{13}(p, \gamma)N^{14}$ 5058
N^{14} from $C^{13}(d)$ 5063
N^{14}, from $C^{13}(p, n)N^{13}$ 5060
Na^{24}, from neutron cross-section 1921
Nb^{95} 5000
Np^{237} 4322
O^{15} 3587
O^{16} 1834
O^{16} photodisintegration, resonances 444
O^{16*} spin and parity 7130
O^{16} elastic α-scattering 6224
O^{17}, by deuteron reactions, magnetic anal. 1914
Pb, shell struct. data 2700
$Pb^{201, 202}$, isomeric levels 1050
Pt^{196} excited states, angular momenta 3523
Ra^{226} 400, 7104
Rh^{106} 5675
S^{32} 1834
S^{33} and Si^{29} states from (d, p) stripping 3591
Si^{28} 1105
Sn^{114} first excited state 7882
Ta^{182} 1084
Tb^{161} spins and parities 1054
$Tc^{93, 96}$ isomeric transitions 2660
Ti^{47-51} from $Ti(d, p)$ reactions 1836
Ti^{48} 7866, 8668
Ti^{48}, excited levels 1051
V 1835
Zn^{67}, data from Cu^{67} decay 7865
excitation see *Nuclear excitation*
magnetic moment see also *Molecules, nuclear coupling; Nuclear magnetic resonance*
determination from radiospectra 1840
odd-mass nuclei in *jj*-coupling 1842
relativistic corrections 1843
electron, interaction relax. time, metals 2550
nuclear induction, dynamical theory 2619
deviations from *LS* coupling 2620
nuclei with almost closed shells 3524
nuclear particles, relativistic corrections 4278
odd-odd nuclei, strong spin-orbit coupling model 4283
in mag. field, geom. soln. 4284
departures from single-particle model 4285
sign det. from γ-ray polarization 5033
list and interpretation 7030
mag. resonance method, modulation correction 7840
As^{75} 2618, 3525, 6180
B^{10} 2618

Nucleus—*contd.*
magnetic moment—*contd.*
Bi^{209} 2618
Ca^{43} 7039
$Cl^{35, 37}$ 2618
Co^{57-8} 1841, 4280
Cr^{53} 968
$Cs^{131, 134}$ 4279
Fe^{57} 6181
$In^{113, 115}$ 2618
K^{42} 4279
N^{14} 2618
Na^{24} 4279
Pd^{105} 5659
Pr 2621
Pr^{141} 4282, 7829
Rb^{86} 4279
Si^{29}, S^{33}, Zn^{67}, Se^{77}, $Te^{123, 125}$ 3525
Ta^{181} 1034
magnetic resonance absorption see *Nuclear magnetic resonance; Paramagnetic resonance absorption*
spin see also *Molecules, nuclear coupling; Spin-lattice coupling*
interaction in HD gas 357
information from inelastic scatt. and subsequent γ-radiation 417–18
odd-odd nuclei, expt. and theory compared 1025
spin assignments 4283
and *j-j* coupling 6175
general formulae 7838
measurement problem 3518
spin-orbit coupling, and neutron polarization 4391
in psc. meson theory 7457
det. from inelastic scatt. 4967
higher spin polarizations in nuclear reactions 5054
from Zeeman effect forbidden components 5383
even-even nuclei, rule for spins and parities 6173–4
isotopic spin and charge parity selection rules, breakdown? 6182–3
determination method using reson. freq. shifts 6947
list and interpretation 7030
composition rule 7148
j-j coupling model, pairing energy 7837
mag. reson. invest., and theory 7839
isotopic spin selection rules, electric dipole transitions 8639
charge independence and nuclear reactions 8640
Al^{27} 6948
Am^{241} 2616
B^{10} in shell model 4964
Bi^{214} 6196
Ca^{43} 7039
Co^{57} 4280
alignment in Co isotopes 4288
aligned Co^{60} 4289
Cr^{53} 968
$Cs^{131, 134}$ 4279
in liq. He^3, alignment 2415
Ir 6952
K^{42} 4279
Li^6, in shell model 4964
N spin-spin coupling 7824
Na^{24} 4279
Na microwave spin resonance absorpt. 1602
O^{16*} assignments 7130
isotopic spin selection rules, O^{16} transitions appl. 8638
Pd^{105} 5659
Rb^{86} 4279
$Ru^{99, 101}$ 2614
Sb^{124} ground state 5656
Si^{28} spin and parity assignments 8678
Sr^{88} levels 5695
Te^{124} excited state 5656
V^{50}, by paramag. resonance 380
$V^{48, 50}$ 1869, 2615
theory see also *Fundamental particles; Nuclear forces*
shell model, further test 376
discussion 5648
discussion of isomers 4276
β-decay of mirror nuclei 5687
ditto, core/particle ang. mom. sharing 5688
and isotopic shift 7833
derivation, from many-particle system 8637

A complete list of the Subject Headings will be found at the end of the Index.

Nucleus—*contd.*
- **theory**—*contd.*
  - C^{14} β-decay v. long life-time, models 411
  - zero-zero transitions 420
  - β-stable nuclei, even mass number, forecast 1023
  - H^3 binding energy calc. 1029
  - nuclear space, Riemannian 1031
    - hyperellipsoidal 1032
  - structure and forces rel. 1837
  - nuclei as compressible drops, oscillations 1838
  - statistical theory 2605–6, 7028
    - fission asymmetry rel. to excitation energy appl. 435
    - and angular distributions 7029
    - distribution of neutrons and protons 7836
  - nucleons angular momentum distrib. 2607
  - quasi-atomic model, meaning of shell 2608
  - *jj*-coupling, the $g_{2/9}$-shell 2609
    - odd-mass nuclei, mag. and quadrupole moments 1842
    - fractional parentage coeffs. calc. 6171
    - pairing energy 7837
    - binding energies 8636
  - uniform model re-examined 2612
  - *LS* coupling deviations in spheroidal core model 2620
  - nuclear forces, review 2958
  - tensor force interaction 3521
  - nuclear constitution rel. to fission 3522
  - deuteron stripping process 3585
  - information from atomic energy levels h.f.s. 4269
  - relativistic theory of resonance reactions 4597
  - nuclear props., mesonic interpretation 4610
  - energy valley surface, graphical repres. 4958
  - nuclear states, geom. characterization, ang. correl. theory 4961
  - heavy, stability, strong coupling psv. theory 4963
  - angular correl., appl. 4979
  - elementary review 5654
  - struct. evidence from β-decay data 6166
  - dilatational oscillations 6168
  - binding energy calc., He^4, single-particle wave functions 6170
  - spin orbit coupling and mesonic Lamb shift 6172
  - a systematic of α-energies 6179
  - isotopic spin and charge parity selection rules, breakdown? 6182–3
  - Maxwell–Lorentz electrodynam., $(5 + 1)$ dimension generalization 7027
  - matrix elements of non-central forces 7032
  - mass surfaces expression 7033
  - discontinuities in nuclear mass surface 7034
  - excited state energies, preferred ratios 7035
  - energy in the nuclear field 7452
  - application of self-adjusting field method 7830
  - heavy nucleus level density calc. 7831
  - liquid drop behaviour of independent particle model 7834
  - Bethe–Weizäcker law, empirical modifications 7835
  - charge struct. rel. to electron scattering 8448
  - dynamics, in nuclear model 8634
  - isotopic spin selection rules 8638–9
  - change independence and nuclear reactions 8640

Oceanography see also *Liquid waves; Seawater; Tides*
- wave-recorder for use in ships 1277
- fluctuating levels, rel. to earth's moment of inertia 1285
- wave generation by wind 2235
- sound scattering from sea surface 5348
- distrib. of Ra in deep-sea sediments 5794
- det. of Io in deep-sea sediments 5795
- sound reflection from temp. changes 6567
- temperatures at 4725 m from O^{18}/O^{16} ratio in fossils 7346

Optical films see also *Filters, optical*
- multiple, compared with Ag in interferometry 161
  - reflection and transmission 2381
  - lamellar reflectivity 4037
  - reflecting, 4000 to 4600 Å 4738
  - oblique transmission factor 5978
- evap. technique damage of optical glass 173
- many nonabsorbing films as band-stop filter 764
- plane-parallel, interference, reversibility of rays 2357
- reflection phase shift rel. to refract. index 4039

Optical films—*contd.*
- Al, phase and intensity measurements 4718
  - effect of vapour incidence 5126
- thick metallic, reflecting powers in Schumann region 4737, 7605
- thin absorbing layer, polarized light prod. 4746
- TiO_2, as near i.r. selective reflectors 5977

Optical images see also *Aberrations, optical; Resolving power, optics*
- defects, information theory analogy 725
- photographic, Fourier integrals appl. 1323
- object and image space rel., thin lens systems 1484
- Schlieren, radial symmetry 1565
- out-of-focus, apparent magnification 2311
- phase-contrast, degree of contrast calc. 2396
  - combined effect of aberrations and central obstruction 5379
  - theory 5990
- diffraction, in annular aperture systems 3087
  - theory 4688
- differential laws of deformation 3968
- acoustic waves at concave mirror 4669
- in unsymmetrical, 3-lens, pancratic systems 4686
- analysis and synthesis 4687
- formation, photon theory 5369
- "transport" by coated wires 6594
- light distribution equations 7545
- Smith–Lagrange invariant, extension 7546
- image quality of objective with 3rd-order spherical aberration 8307
- definition in microscope without eyepiece 8352

Optical instrument testing
- cameras, with variable focal length collimator 574
- lens testing bench 1566
- planeness and bending of optical flats 2973
- paraboloidal reflectors, new line board test 4751
- diffraction gratings, by phase-contrast methods 6674

Optical instruments Other instruments are listed separately, e.g. *Refractometers*
- in textbook 98
- Raman apparatus design 111
- parabolic surface generation 171
  - mirror surface obtained by heat deformation 172
- 3 basic physiological optics equations 1305
- suspended particle counting device 1402
- rangefinders, variable prism unit 1485
- multibeam ophthalmoscope for retinal physiol. study 2115
- for recording h.f. cinematograph images 2134
- angle comparator for photog. detonation records study 2223
- Soleil compensators, exam. and calibration 3190
- coated-wire image transporters 6594
- diffraction, theorems and their application 6672

Optical lever
- use in polymer 2nd-order transition point meas. 1576
- transient waves through solids, meas. appl. 3035

Optical materials see also *Filters, optical*
- in Schumann region, transparency rel. to temp. 140
- glass damaged by evap. films technique 173
- coloured Perspex for darkroom lights 1539
- fused quartz u.v. microscope objective 1567
- CsBr infrared prisms 2328
- glass and Lucite coloration by radn. compared 2638
- glasses, photoelast. const. det. 3192–3
- surface polishing defects, phase contrast exam. 3217
- plastics, in photoelast. interference expts. 4747
- 980 : 222 glass, opt. charac. 5940
- infrared transmission of silicate-glass films 6645

Optical rotation see also *Magneto-optical effects; Polarimeters; Polarized light*
- water vapour 2392
- natural rotatory power, Kuhn's theory 5428
- and circular dichroism in crystals 5429
- Na_2HPO_3, Li_2HPO_3, NaH_2PO_3, LiH_2PO_3 solns., molec. rotations 5597
- in cryst., rel. to atomic arrangements, review 8769

Optical systems see also *Aberrations, optical; Lenses; Optical images; Optical instruments; Optical materials; Resolving power, optics*
- cone channel condenser optics 104
- having telecentric ray paths in image space, difference formulae 105

Optical systems—*contd.*
  information theory analogy 725
    appl. to microscope as linear filter 5378
  spherical mirrors, finite-difference eq. appl. 1483
  thin lenses, object and image space rel. "algebra" 1484
  variable prism unit for range finders 1485
  aberrations, reduction in rotating-prism compensators 1486
    simultaneous fine correction 5374
  u.v. objective for ordinary microscope 1567
  complex, image forming, ray path calc. 2312
  flare, meas. and origin invest. 2313
  with annular aperture, diffraction images 3087
  ray trace calculations, utilization 3967
  decentred, aberration 3969
  partial coherence and transmission functions 4044
  continuously varying refract. index, eq. 4685
  unsymmetrical, 3-lens, pancratic systems 4686
  interference systems with given spectro-properties 4739
  apparatus for opt.-diffract. method of X-ray anal. 5209
  light distribution eqns. for images 7545
  for attenuating luminances 8303
Optics see also *Atmospheric optics*
  textbook 98
  information theory analogy 725
  oil industry applications 1320
  reversibility and irreversibility, thermodynamic criteria 2306
  wave-to-ray stepwise transition, inhomog., absorbing media 2310*
  stochastic processes theory appl. 3961
  communication theory appl. 3962
  partial coherence and transmission functions 4044
  parageometrical, diffraction at curved surface 4677
  particle motion across potl. jump., wavemech. analogy 7469
 geometrical see also *Aberrations, optical; Lenses, mirrors, etc.; Optical images*
  cone channel condenser 104
  Maxwell's eq. soln., appl. to formulae 724
  ray tracing methods 1481
  graphical solutions to 3 problems 1482
  of complex image forming systems 2312
  light rays in variable refract. index medium 4684
  ray deflection with continuously var. refract. 4685
  heterogeneous medium parameter for given beam path 5377
  deduction from diffraction asymptotic treatment 5939
  coated wires as image transporters 6594
Oscillations see also *Electromagnetic oscillations; Liquid oscillations; Piezoelectric oscillations; Vibrations*
  forced, in arbitrary domain and "damping principle" 83
  equations, numerical and graphical integration 1328
  mechanical systems, duality appl. 1441
  damped, of sphere in viscous fluid 1445
  radial, of ions, excitation in cyclotron 2497
  forced, with nonlinear restoring force 3447
  subharmonic, in non-linear systems 5336
  primary *Pfeifenton* freq. rel. 5350
  non-linear quasi-conservative systems 7519
Osmotic pressure see also *Membranes*
  polymer soln. virial expansion, 3rd coeff. 68
  coeffs. det., thermistor bridge method 2246
  transport phenomena, thermomechanics 4642–3
  macromolecules, mol. wt. det. 4644
Oxidation
  rate, in alloys, diffusion processes determining 481
    Cu, moderate temp., press. effect 2007
  slow, thermal, of cyclopropane 502
  free inorg. radicals in soln. 1204
  Pb compds. inhibiting effect, in di*iso*propyl ether oxidation 2004
    in methane oxidation 2800
  by ultrasonics, KI, rel. to wavelength 2018
    O acceptor inhibiting action 5761
    of N, in air contained in water 8029
  paraffins, photosensitized 2021, 8023
  internal, of metals 3636
  metals and alloys, high temp., mech. 3637

Oxidation—*contd.*
  benzaldehyde, in soln., kinetics 3684–5
  Fe, critical temp. ~200°c 4456
  Cu, oxide layer flow 6247
  ferrous sulphate in H_2SO_4 by radon radn. 8028
  Fe^{2+}, by pile radiations, differential 8743
Oxide cathodes see *Cathodes, oxide*
Oxygen
  Maxwell reflection coeff. det. 81
  energy per ion pair 933, 4885
  mobility in O of electrons, meas. 935
  poisoning of oxide cathode emission 938
  Verdet const. det. 1792
  optical anisotropy, modified Silberstein model 1820
  ion drift velocities 2514
  sound absorpt., l.p. 3046
  magnetic props in clathrate cpd. 3438
  refract. index at 9200 Mc/s 3455
  relationships with metals 3636
  gas phase reaction with acetylene 3675
  O^{18} enrichment by fract. dist. of H_2O 3707–8
  condensation nuclei production by u.v. light 3775*
  liquid, atomic distrib. curve study 3920–1
    compressibility, molec. radius, assoc., from sound velocity meas. 4664
  solubility in Pyrex at 1170°c 3925
  shock front shape and thickness 3945
  formation inside irradiated nitrate crystals 4450
  molec. film on W, accommod. coeff., tech. 4452
  O_2 fine structure theory, microwave spectrum data 4714
  proton energy losses 4874
  effects of oxide cathode elec. props. 4892
  O_2 electronic structure 4947
  oximeter, portable, ear, for man 5263
    for continuous O saturation estimation 5264
  intermol. force consts. 5618
  double ionized, triplet splitting 5661
  normal boiling points, thermodynamic scale 6002
  absorption, effect of added N_2 6643
  pre-breakdown currents 6892
  gaseous, isotopic exchange with liq. H_2O, catalysis 7057
  reaction with NH_3, kinetics 7234
  adsorption at high saturation on Al 8033
  spec. heat below 4°K 8384
  automatic absorption recorder 8754
  metabolism, respirometer for rapid changes 8822
Ozone
  electrometric det. at high dilutions 1233
  atmospheric, diurnal var. of reduced thickness 1280
    optical upper limit of layer, sharpness 2095
    effect on twilight sky brightness and colour 2852
    det. from solar energy meas. 3773
    amount, rel. to meteorolog. conditions 5233
    meteorolog. var. over Edmonton 7348
    temp. meas. in upper atmos. appl. 8124
    absorption of sunlight, atmos. temp. changes 8127
  liquid, density 5318
  dimensions, angles, of molecule 5644
  absorpt. bands, high-dispersion study 6617
pH
  effect on ionization, biological importance 2010
  response of non-hygroscopic glasses 2787
  changes, effect on protein struct 4024
  brain, micro-electrode for recording 8823
Pair creation see *Electron pairs*
Palladium
  H transmission by electrolysis 2752
  thermal cond., low temp., mag. field 6698
  Pd Pirani gauge, construction 7266
  $\alpha PdBi_2$ and PdBi as superconductors 7686
  thin film, granular structure 7971
  electropolishing 8017
Paraffin wax
  solid, surface free-energy 1415
Paramagnetic resonance absorption see also *Nucleus magnetic moment*
  in crystalline solids 124
  in additively coloured alkali halide crystals 323
    KCl, rel. to *F*-centres 2546
  in liquids, rel. to conc. 325
  V^{50} nuclear spin det. 380, 2615

Paramagnetic resonance absorption—*contd.*
  in K chromicyanide 968
  Cr^{+++}, Fe^{+++}, Gd^{+++} spin paramagnetism 970
  in phosphors with paramag. activators 972, 8564
  in Cr alums, and relaxation, low temps. 1573
    forbidden transitions 8557
  in V salts 1752
  in Gd metal, *g*-value calc. 2537*, 8555
  relaxation in CrK alum 2542
  in K ferricyanide 2544
  in Cu acetate 2547
    anomalous 4914, 8559
  $(SO_3)_2NO^{--}$, h.f.s. 2548
  paramag. relaxation in metals 2550
  $Ru^{99, 101}$, spin det. 2614
  Fe alum, dilute, ground state invest. 3430
  and dispersion, crystall. salt powders, $9\cdot62\times10^9$ c/s 3431
  calc. of nuclear band size in liq. 3434
  dipolar broadening in magnetically diluted cryst. 4217
  in 4 double nitrate salts 4911
  hydrazyl compds., dil. solns., h.f.s. 4913
  Ti, V, Cr, Mn, Nb, La, Ce, W 5568
  $Gd(NO_3)_36H_2O$, single crystal 5569
  paramagnetic resonance, reviews 5571, 8566
    and relaxation 5385
  in some Mn salts 6135
    and V salts 1752
    Mn formate 6137
    diluted, fine and hyper-fine struct. 8567
  $CuK_2(SO_4)_2.6D_2O$, h.f.s. 6142
  Fe^{57}, data towards nuclear mag. moment 6181
  electron spin resonance in Si semicond. 6775
  interactions, effect on entropy and susceptibility 6931
  Mn in ZnS, effect of mech. treatment 6945
  rare earth salts, theory 6950, 8562
    ethyl sulphates 7797
    Nd ethyl sulphate, h.f.s. 1750
    Pr ethyl sulphate 1751
  in Cu, Mn, trivalent Fe ions 6944
  of two free radicals, temp. var. 6946
  $(NH_4)_2IrCl_6$, covalent bonding 6952
  exchange narrowing, theory 8514
  K solns. in liq. NH_3 8563
  $Ag(phn)_2S_2O_8$ 8568
  magneto-optical effects rel. 8597
Paramagnetism see also *Magnetic properties; Magnetism; Magnetization*
  in FeS_n, Yosida's theory 317
  anomalous, of $CuSO_4.5H_2O$ 324
  exchange coupling, Fe ions in org. molecules 966–7, 8561
  crystalline field theory, Cr alums 969
    rare earth salts 6950, 7797, 8385, 8562
  low-temp. props. theory, Cr alums 971, 1573, 1589
  uranyl-like ions, theory 2532
  ferrous and Zn ammonium sulphates, anomalous spec. ht. study 3270
  relaxation frequencies at low temps. 5570
  ferromag. metals, effect of atomic vibr. 5607
  interactions effect on entropy and susceptibility 6931
  S ion diffusion effect in AgBr, high temp. 6943
  adiabatic demagnetization of $CH_3NH_3.Cr(SO_4)_2.12H_2O$ 6949
  low temp. props. theory, $Ce_2Mg_3(NO_3)_{12}$ 7630–1
  intermetal compounds rel. to electron distribution 7791
  exchange interactions in paramag. salts 8512
  exchange narrowing in paramag. reson. 8514
  W, Mo, Nb, V, Cr, Mn, Fe, neutron diffraction invest. 8525
  neutron scattering by Pr, Nd, Er trivalent ions 8527
  high temp. susceptibility of V, Nb, Ta, W, Mo 8558
  anomalous, of Cu acetate 8559
  of solid state, review 8566
Particle accelerators see also *Ion beams*
  high voltage generation by β-emissive radioisotopes 428
  high-energy, electron, radn. charac. of targets 2493
  source pulse synchronizing links 3363
  elementary theory 4146
  20–250 kV Cockcroft–Walton regulator 8454

Particle accelerators—*contd.*
 linear
  current integrator 906
  radial focusing appl. 908
  pos. ion tubes, deterioration causes 909–10
  for $2\cdot3$ MeV pos. ions, converted electron accelerator 1684
  Van de Graaff, focusing system 1688
  long, high-voltage tubes, ion optics 3362
  travelling-wave, for X-ray therapy 4135
  helical-wire, travelling-wave, focusing method 4147
  proton, new focusing principle 4148
  neutral particle "screening" in ion accel. tubes 4864
  phase debunching by focusing foils 5523
  electron accelerator for 3 to 4 MeV 6832
  with $\beta = 1$, electron axial motion 6833
  theory of motion of ions 6855
  portable 250 kV type 6859
  ions in increasing accelerating field 7728
 orbital
  synchrotrons, 35 MeV installation 888
    strong-focusing 907, 4865
    operating principles, review 3365
    beam charac. 4134
    proton, at Birmingham 4866
    strong-focusing, mag. inhomogeneities, effect 6857
    oscillator control 8453
    strong-focusing, orbit stability 8456
  betatrons, Zurich installation 889
    long X-ray pulse prod. 6829
    accel. to cosmic-ray energies 7755
    20 MeV, accurate energy control 7927
  cyclotrons, tech. and apparatus for Ag radn. damage study 1171
    meas. of power to target 1686
    electron, optimum adjustments 2480
    elec. fields in dees 2496
    acceleration of Be^9, $C^{12, 13}$, $N^{14, 15}$, O^{16} and Ne^{20} to high energies 3361
    Harwell, proton energy spectrum 6858
    target, pump assembly 7119
    fixed freq., theory 8455
  synchrocyclotrons, for 450 MeV protons 1685
    magnetic deflector perturbations 3364
  ions, radial oscillations, excitation 2497
  microtron phase stability 3346
  alternate guiding and focusing magnets appl. 4145
  cosmotron, strong focusing, alignment defects elimination 6092
    magnetic defects, effects 6856
  "strong-focusing" principle, origin 7729
Particle size see also *Surface measurement*
  and counting, flying spot microscope appl. 175
    automatic, by successive countings 2225
    automatic, errors 3896
  size effect in Cd superconductivity 237
  small glass spheres size analysis 479
  thickness meas., fine particles 637
  granulometric analysis, automatic method 1403
  X-ray scattering methods, interference effects 1674
    clay suspensions 2793
    pyrophoric Fe powders 7320
  swelling during sol-gel transition 2027
  light scattering methods, reflectance correction 3186
    by polarization ratio, unfiltered light 4745
  unresolved opaque particles, variable phase contrast size det. 3224
  electron microscope method 4413
    electrically precipitated deposits, study 1973
  rod-shaped, flow birefringence 4748
  ferromag. powders, meas. methods 7974
    pyrophoric, X-ray meas. 7320
    rel. to mag. props. 8572
  in suspensions, theories of measurement 8628–9
Particle track photography see also *Cloud chambers*
  protons, fast, multiple scattering 271
    range-energy rel. 3370
    130 MeV, stars, cross-sections 4348
    collision mean free path 8680
  distortion in emulsions, measurement 298, 8168
    reduction 4549
    non-uniform track shrinkage 7369

Particle track photography—*contd.*
α-particles, range in water det. 402
and deuterons, range-energy rel. in Kodak NTB emulsions 2882
and protons, range-energy rel. 3370
<5 MeV, range, rel. to range in air 7084
ionization loss in emulsions, density effect 932, 1103, 6364, 6367, 7370, 8167
isolated tracks due to cosmic rays 945, 1732
U mineral "chemical" age det. RaD method 1047
T-tracks study 1102
search for 2883
meson studies, sandwich meas. of pos. excess 1714
high-energy pions, multiple scattering 1940
μ-mesons from π-meson decay, range distrib. 4381
Bristol κ_1-meson mass, photoelec. det 4386
elastic pion-hydrogen scatt. 4387
neg. μ-mesons 5107
210 MeV π^--mesons, nuclear interact. 5109
unusual π–μ decays 7174
neutron and meson stars in light elements 7910
117 and 222 MeV π^- meson tracks, grain density 8170
μ^- capture 8696
μ^--mesons, assoc. electrons 8697
star distrib., statistical study 1734
stars due to neutrons 3579
fission fragments energy loss meas. 1927–8
radioactive method for mosquito marking 2106
emulsions exposed to neutrons with γ-radiation, development 2131
cloud-chamber, graphical analysis 2507
pegmatite U content meas. 2641
a Li^9 disintegration 2648
some reactions due to photons, Ilford emulsions 2716
α-track autoradiographs of biol. specimens 2875
background tracks, electron-sensitive emulsions 2878
processing, 200 μ emulsions 2879
100 to 1000 μ emulsions 6368
Los Alamos methods 8171
nuclear emulsion tech., reviews 2880, 6366
heavy nuclei, taper length rel. to Z 2881
deuterons, range-energy rel. 2882
γ-ray fog discrimination 2884–5
range correction for electron pick-up 3371
high-energy particles (book) 4193
neutron spectra study methods 4353, 8171
track measurements, length 4548
grain density 1103, 8166–7, 8169, 8304
grain size 8159
statistical analysis of grain counting 8164
instrument for detailed exam. of tracks 8166
Los Alamos methods 8171
Ac quantitative estimation method 4975
Re natural radioactivity study 4980
delta rays, linear density 5529
pos. ions range-energy curves, emulsions 5530
new method of particle mass det. 5531
ang. distrib. of particles from stars 5087
use of stripped emulsions 6365
latent image fading 6369, 8161
fast charged particle, Cherenkov loss 6850
range-energy rel., general calc. 6869
α-particles and deuterons 2882
protons and α-particles 3370
curves, pos. ions 5530
small and large aperture "jets" in emulsions 7120
photo-alpha reactions, grain-gradation development 7142
stereoscopic cameras for cloud chamber 7371
bubble chamber, of penetrating cosmic-ray particles 7765
autoradiographic detection of α-radioactive aerosols 7856
grain size in Ilford G5 emulsions 8159
photometric meas. in emulsions 8169
Li salts, Li^6 content by plate blackening 8645
due to $Bi^{212}H_3$, large no. of proton tracks 8656
ang. correl. of disint. products in emulsions at 95 000 ft. 8671
method for long high-altitude exposures 8810
Particles see *Fundamental particles; Scattering, particles*
Pendulums
possible motions of sphere on string 2218
sustained Foucault pendulums 2920
coupled, X-ray selective absorpt. analogue 3736
Pentane
n-pentane mixt. with n-pentforane, props. 70
neopentane, gaseous, compress. of eq. of state 74
CH_3^+ and $C_2H_5^+$ as hydrides of central C atom 3393
photobromination 513
Pentforane
n-pentforane, props. 70
Periodic system see also *Elements*
order of filling in atom electronic levels 3526–7
rel. to nuclear struct. 6186–7
related to Thomas–Fermi equation 7051
Permeability, magnetic see *Magnetic properties; Magnetization*
Permeability, mechanical see also *Diffusion, solids*
saturated soil, *in situ* meas. 2750
septum permeation by H from flames 3635
Permittivity see *Dielectrics*
Phase-contrast microscopes see *Microscopes, phase-contrast*
Phase equilibrium see also *Solubility; Solutions*
metallurgical equilibrium diagrams (book) 482
of superconductors in mag. field 6025
binary systems
NaCl–H_2O at supercritical temp. and press. 1998
In–Pb, X-ray and elec. conductivity study 2754
vapour-liq., in He_3–He_4 solns. 3253
water-ammonia soln., entropy charts 5449
liquid-liquid and liquid-solid, app. for rapid det. 6279
liquid/solid He 6725
in calcite-aragonite system 8007
Phase transformations see also *Thermal transformations*
NH_4Cl, NH_4Br solid solns., transition temps. 181
$BaCa_2$ n-butyrate 182
superconductor, free energies and phase transition 242
propagation velocity 6806
metallurgical, proof with needle counter 801
polarized light modifications in hexamethylbenzene 1252
Hf–H system, X-ray diffract. study 1262
transformation press. effect on fusion heat 1577
on melting vol. change 1578
hysteresis at A_3 and A_4 points in Fe 1579
solid to liquid, theory 2238
2nd-order, rel. to critical phenomena 2407
He I/He II in He^3/He^4 mixt. 2411
statistical mechanics 2427, 3240
in Co, by macroscopic shear 2755
hexagonal to cubic 4764
adsorbed layers, N 2796
occurrence doubtful 3694
in solid hydrogen halides 3242
Zr–Hf system, allotropic 3243
Xe liq.-vapour coexistence curve, critical region 3244
Mn, magnetometric studies 4056
KH_2PO_4, ferroelec. state onset 4073
X-ray analysis 6756
magnetic struct. transitions 4202
heterobaric transitions, thermodynamics 5437
$BaTiO_3$ metastable states 5454*
polymorphic, in ferromag. subst., mag. field influence 5605
retained austenite transformation by fracture 5730
Cu–Al, electron diffract. study 5733
polystyrenes, rel. to heat of soln. 6304
anhydrous Na_2CO_3 transition points 6713
alkaline phosphates and arsenates, at 9500 Mc/s 6755
in antiferroelec. $PbHfO_3$ 7656
rotational transition, statist. theory 7812
steel, X-ray invest. 7978
Ti, crystallography 8095
Bi I to Bi II at high press. 8358
metastable, of NH_4NO_3 8362
in O below 4° K? 8384
Phonographs see *Sound reproduction*
Phosgene
crystal structure, molecule structure 7328

Phosphine
- cohesion theory of liq. struct. 1424
- structure of PH_2D and PHD_2 5645

Phosphorescence see *Luminescence*

Phosphors see *Fluorescent screens; Luminescence*

Phosphorus
- opt. and elec. charac. (book) 234
- heat of fusion, transformation press. effect 1577
- change of vol. on melting, rel. to transform. press. 1578
- effect on steel spectral intensity 2802

Photochemistry see also *Photographic process*
- pentane photobromination 513
- free radicals, formation mechanisms 1204
- molecular quantum absorption light-intensity dependence 1220
- oil industry applications 1320
- solid K azide photolysis, exciton mech. 2017
- sensitization, rel. to reaction products stabilization 2019
- apparatus for far u.v. reactions 2020
- paraffins, photosensitized oxidation 2021, 8023
- 1470 Å irrad. of N–H mixtures and NH_3, effect 2788
- Hg^{202} enrichment 3535
- Becquerel effect in presence of dyestuffs 4103
- H_2S decomp., temp. effect 4447
- organic free radicals prod. by light 4448
- Ag halides with admixture, irradiation intensity effect 5166
- acetaldehyde photolysis 5167–8
    - liq., photo-oxidation, mech. 5743
    - and diacetyl and acetone, high-intensity photolysis 8022
- flash-initiated reaction, photometric study 5169
- processes in alkali halide crystals, low temp. 5170–1
- acetone photolysis 6280, 8022
- inflammability of explosives by high-intensity radn. 6295
- benzene decomposition by intense u.v. 6296
- azomethane decomposition, 24–190°c 6297
    - methyl chloroformate photochlorination, gas phase 7252
- toluene bromination, bond dissoc. energies 8024
- NH_4 halide coloration 8322

Photoconductivity
- in the elements (book) 234
- transient photocurrent meas. instr. 4104
- e.m.f.'s generated in semi-cond. by modulated light 5472
- infrared, review 8424
- AgBr polycrystall. film for measurements 6799
- Ag–Cs_2O–Cs, pulsed irradiation 7678
- B, props. 1641
- Ba azides, exciton mech. 2017
- BaO activation study 3397
- CdS 1547
    - needles, field emission, light effect 887
    - crystals, at high temps. 4811
    - monocrystall., X-ray excited, props. 6053
    - variations under X-irradiation 6792
    - crystals, surface 8425
- CdSe needles, field emission, light effect 887
- K azides, exciton mech. 2017
- MgO, irradiation-induced 7682
- PbS, rel. to absorption edge 3130
    - photoresistances, effect of O 6055
    - effect of O 7677
- PbSe cells in i.r. spectroscopy 6605
- Si, i.r., due to neutral impurities, Si 2462
    - i.r., at low temps. 3312–13
- Ta_2O_5, anodic 233
- ZnS, spectral response 860

hotoelasticity
- breakage study 2391
- *p* and *q* det., optical glasses 3192–3
- quenched cylinders and spheres, study 4424
- stress det. in cylindrical shell 4625
- plastics appl., Fizeau fringes method 4747
- NaCl strain-optical const., molec. interpret. 5427
- invest. of fracture of LiF crystal 5739
- ethoxylene resin appl. 6677
- elasto-plastic stress anal., AgCl 6678
- isochromatic lines in transparent models 7616

Photoelasticity—*contd.*
- fractional rel. retardations, meas. methods 7617
- $PbNO_3$, stress-optical constants 8346
- frozen-stress method, initial stress correction 8347

Photoelectricity see also *Photoconductivity*
- textbook 98
- emission associated with β-band absorpt., KI 232
- new devices using carrier injection 861
- photosensitive surface study with flying-spot scanner 862
- photomultipliers, for scint. counting 930
    - vac. u.v. spectrophotometry appl. 3102
    - for stellar photometry 6430
    - dark currents 6790
    - and photocell, input/output characteristics 7540
    - survey 7683
    - stabilizing device 7743
- intensification of fluoroscopic images 1319
- photoelec. absorpt. process in solid insulators 2360
- emission from semiconductors, transition probability 2449–50
- Se, crystals, Brown effect 2459
    - cells, charac., explanation 6793
- Cs_2Te and Rb_2Te photoemission 2460
- Cs_3Sb, photoel. energy distrib., scattering effect 2461
    - emission, spectral distrib. 4102
- Ge phototransistors, props. 4096
- Ag–Cs tubes, fatigue 4101
- Becquerel effect in presence of dyestuffs 4103
- photo-magneto-elec. effect 4812
- metals and non-metals, surface invest. 4833
- PbS, layers, rel. to absorpt. spectra 5393
    - special type cell, props. 6056
- internal effect, polycryst. CdS 5473
- photo-cell variable curr. at high illuminations 6054
- internal photo-effect, electron optic study 6057
- photoeffect in homog. elec. field 6791
- cells for vac. u.v., Ni, Pt, W appl. 6796
- I, 3 allotropic forms, constants 6797
- infrared sensitivity of CuO cells 6798
- electron stream action on valve photocell sensitive layer 7676
- photoemission from Ag into AgCl, KBr, NaCl, new photosensitivity bands, AgCl 7679
- W photoemission in predicted Schottky deviations region 7680
- thin Bi films 7687
- in alkali halide crystals, field-emission photocell 8397
- i.r. photoconductors, review 8424
- Zn single cryst., effect of abrasion 8442

Photogrammetry
- oil industry applications 1320

Photographic light sources
- high-speed flash tube, eye colour photog. appl. 2872
- synchronized flash-discharge for high-speed cinematography 2888
- spark, in quartz crystal wave field study 4668
- colour-transparency illuminators, requirements 8174

Photographic materials
- amorphous Se layer on metal, image production 2873
- "iso-opacity" curve 4543
- graininess, signal-to-noise ratio appl. 4544
- resolving power, influence of sensitization 6362
    - to u.v. light 7367
- nuclear emulsions, grain density 6367
    - Ilford G5, grain size 8159
    - Ilford C2, radon absorpt. study 8165
    - distortion meas. 8168
- AgBr polycrystall. film for photocond. meas., prep. 6799
- Callier effect., invest. 8158

sensitivity
- Russell effect on evap. metal films 575
- spectral, det., P^{32} aq. soln. Cherenkov radn. appl. 1683
- desensitizers, mode of action 2119–21, 5266, 6351
- rel. to exposure time and temp. 2122
- to short-duration illumination and electrons, rel. 2123
- positive diazotype process, sensitometry 2124
- latent-image formn., AgBr sols. 2874
- reciprocity-law failure 4541
- quantum efficient absorption probability 4542
- Schwarzschild effect representation 6352

A complete list of the Subject Headings will be found at the end of the Index.

- **Photographic materials**—*contd.*
  - **sensitivity**—*contd.*
    - practical sensitivity rel. to laboratory sensitometry 6353
    - desensitization due to press. on emulsions 6355
    - u.v. sensitized plates, vac. u.v. charac. 6359
    - calibration for electron diffraction 6360
    - equation of the characteristic curve 8160
- **Photographic process** see also *Photochemistry; Particle track photography*
  - desensitizers, mode of action 2119–21, 5266, 6351
  - AgBr behaviour under fast electrons 3643
  - surface and internal latent image, surface sensitization 3780
  - transient photocurrents in emulsions 4104
  - sensitivity increase by elec. discharges 4545
  - polyhedral sub-structures in AgBr crystals 6354
  - desensitization due to press. on emulsions 6355
  - immediately visible, and lasting, recording process 6356
  - Clayden effect practical appl. 6357
  - Sabattier effect, mode of production 6358
  - charged particle latent image fading 6369, 8161
  - multiple internal reflections, effect on half-tone densities 8156
  - Callier effect invest. 8158
  - track formation in nuclear emulsions 8167
  - **development**
    - β-ray latent image, intensification 1077
    - autoradiography melted emulsion tech., improvements 2125
    - colour developers, effect of Ag salts without binders 2135–6
    - AgBr cryst., reduction expts. 8162
    - nuclear emulsions 8171
      - neutron- and γ-irradiated 2131
      - 200 μ emulsions 2879
      - distortion reduction 4549
      - 100 to 1000 μ thick 6368
    - developer choice for electron microscope, exposure meter 8830
- **Photography** see also *Cameras; Cinematography; Lenses; Radiography*
  - coloured Perspex for darkroom lights 1539
  - image production in amorphous Se by crystallization 2873
  - grainy images, signal-to-noise ratio appl. 4544
  - photog. plate and objective combination, resolving power 4683
  - Russell effect in Zn single crystal 8442
  - **applications** see also *Photogrammetry*
    - metal optical constants, dispersion meas. 157
    - atm. turbulence anal. by particle photog. 1284
    - recording, Fourier integral appl. to images 1323, 2871
    - phase-contrast, burning velocity appl. 1583
    - etching tech. for electron microscope specimen mounting 1975
    - photometric, brightness distrib. det. 2308
    - X- and γ-ray monitoring, film charac. rel. 2643
    - explosive-driven metal surfaces, study 2749
    - reflecting surface shape det. method 3965
    - clinical radiographic images enlargement 4546
    - quartz crystal wave field, spark-shadowgram 4668
    - X-rays, film dosimetry 5522
    - use of shadow method in acoustics 5907
    - grey wedge pulse-height analysis 6113
    - air photography, system performance eval. 6370
    - spectrophotometry, far u.v. 7555
    - comparing line standards of length 8246
    - photomicrography without eyepiece 8352
  - **colour**
    - correction, masks drawn from subject 1326
    - positive diazotype process, sensitometry 2124
    - of eye fundus, high-speed flash tube appl. 2872
    - rel. to human eye colour sensitivity 2889
    - developers, effect of Ag salts without binders 3135–6
    - review of history and principles 8172
    - multiple internal reflections in prints 8173
    - colour-transparency illuminators, requirements 8174
  - **high-speed** see also *Cinematography, high-speed*
    - Schlieren, flash, gaseous expansion from spark 186
    - cavitation studies 1412
- **Photography**—*contd.*
  - **high-speed**—*contd.*
    - electronically operated Kerr cell shutter 2132
      - elec. discharge study appl. 2133
    - detonation records, angle comparator study 2223
    - of eye fundus, colour 2872
    - image converter techniques appl. 2886–7
    - Boys camera lightning studies 5254
    - multiple spark camera, physics appl. 6371
  - **particle tracks** see *Cloud chambers; Particle trac photography*
- **Photometers** see also *Spectrophotometers*
  - Macbeth illuminometers, colour matching filters 230
  - for ultramicro-spectrophotometry 2321
  - photoelec., device for calibration curve transformation 5833
  - maximum or minimum method 6583
  - photomultiplier cell approximating to eye's colou sensitivity 6593
  - for X-ray intensities on Weissenberg photograph 7306
  - photocell and photomultiplier input/output chara teristics 7540
  - small, omnidirectional 8305
- **Photometry** see also *Brightness; Densitometry; Illumination; Spectrophotometry*
  - Luckiesh–Moss visibility meter 101
  - reflection coeffs., Schumann u.v., 778
  - reflectometers using photometric sphere, errors 148
  - brightness distrib., photog. methods 2308
  - flare of lenses, meas. 2313
  - scale, establishment at N.P.L. 3080
    - primary standard for new scale 3963
  - units, co-ordination 3081
    - quantities and units 6588
    - reduction in number 6589
    - committee report 8383
  - double-beam, harmonic synch. rectification app 3083
  - Ag–Cs phototubes, accuracy 4101
  - night sky, u.v. region 4512
    - diffusion corrections 5249–50
  - text- and reference-book 4682
  - app. for flash-initiated reactions study 5169
  - intensity, brightness and flux, optical meas. 5937
  - extended-source meas. by radiometer calibration 658
  - retro-reflecting matls., meas. methods 6584
  - of curvilinear light sources 6585
  - flux and efficiency of long fittings, meas. 6586
  - filament lamps, special mounting socket 6587
  - sector disk centring, errors effect 6590
  - spectral lights, comparison of measurements 6591–
  - of comets, photographic 6393
    - periodic comet, Schaumasse 6395
  - effect of lens on illuminance 7538
  - Ne indicator tubes as quantitative detectors 7539
  - flame, review 7549–50
    - continuous, modified spectrophotometer appl. 11
  - fluorescent lamps 8302
  - particle track density measurements 8304
    - fission fragment tracks 1928
    - blackening of low-energy tracks 8169
  - use of interference filters 8327
- **Photons** see also *Cosmic rays, photons; Fundament particles; Gamma-rays; Nuclear reactions, photon X-rays*
  - longitudinal and scalar, role 34
  - with non-vanishing rest mass, interference nea imperfect reflector 99
  - de Broglie theory 1384
    - appl. to quantum electrodynam. 7434
  - scattering, lower limits for interaction times 1390
    - twice-scattered, distrib. function 7107
  - in interpretation of interference observations wit relative motion 1476
  - from electron accelerator targets, energy and an distrib. 2493
  - double Compton effect theory 2678
  - self-energy studies 2946, 3866
  - mass, light propagation study 3451
    - in Schrödinger's unitary field theory 5293
  - pair production, momentum transfer and divergen angle 3570

otons—*contd.*
  in electromagnetic vacuum theory 4595–6
  emission, entropy variation of system 4780
  image formation theory of their form 5369
  annihilated, wave function 6488
  flux det., 150–300 MeV, calorimetric 7109
otophoresis
  negative, contrib. to theory 1477
    metal particles, cause 3077
  magnetophotophoresis, research 1796, 8605
    in powdered silver steel 8606
ysics
  definitions in teaching 590
  symmetrical domains appl. in calculations 1330
  space, field and ether, survey 1358
  analytical characterization of quantities in quantum mechanics 1369
  equations, similarity principle for size relativity 2169
  large scale computing appl. 2897
  basic methods in transfer problems (book) 2923
  conservation law theory 2934
  physical quantities possible in quantized universe 2941
  introduction to concepts and theories (book) 3843
  nuclear (book) 4335
  theory in terms of a finite geometry 4550
  elements of dissymetry, definition 4581
  the fundamental prime of a finite world 4582
  trend analysis of physical data 5268
  advanced mathematics appl. (book) 6372
  meaning of concepts, measurement, magnitude, probability 7463
  analogue representation of problems, survey 7474
  importance in electronic valve industry 8461
hysiology see also *Biological technique; Blood; Electrobiology; Hearing; Vision*
  all-glass dispersion oxygenator and pump 2107
  diving decompression ascent curve 4525
iezoelectric oscillations
  quartz, resonance up to 5000 atm. 835
    odd, even and half-odd harmonics 2440, 8279
    wave field study 4668
    surface vibration 7530
  vibrators, design and charac. 1461
  "textural" Rochelle salt laminae, vibration anal. 1469
  crystal plates, thickness vibrations 2439
  monocrystall., biaxial dielectric in cavity resonator 2559, 5582
  wave propag. in crystals, theory 4792
  piezoelectric well hydrophone 5930
  pick-up, anomalous transient response 6566
  Al elast. const., low temp. meas. 7988
iezoelectricity see also *Electrostriction*
  of dielectrics, rel. to ferroelectricity and crystal struct. 209
  $BaTiO_3$, ceramics containing $CaTiO_3$, Y_2O_3, $PbTiO_3$, improved temp. stability 832
    prepolarized electromech. response and dielec. loss 6562
  $ND_4D_2PO_4$ (deuterated ADP) props. 1236
  Rochelle salt voltage meas. 1625
  KH_2PO_4, props. below Curie point 4073
  crystals, Raman spectra, ZnS 4733
  of ice, invest. 5465
  linear equations of state 6763
  cryst. props., tech. for testing 8393
  rel. to atomic arrangements in cryst., review 8769
iles, nuclear fission see *Nuclear fission reactors*
lanets see also *Solar system*
  horizontal refraction in atmosphere of Venus 1339
  visibility during twilight 2915
  fluid, equilib. configurations, hydrostatic theory 2921
  asteroid Icarus, relativity precession 2931
  criticism of Kuiper's cosmogony 6388
lastic deformation see also *Slip*
  Cu_3Au and CuAu, effect on order 485
  surface effects, survey 490
    flat surface wear 8002
  AgCl, optical invest. 491

Plastic deformation—*contd.*
  metals, cleavage surfaces of crystals 1164
    determination of energy stored 2767
    steel rod model study 3647
    flow (review) 3651
    single crystals, deformation bands role 3652
    low temp., rel. to struct. 6271
    cubic, Bauschinger effect 7995
  Ge and Si single crystals 1190
  during diffusion 1964, 7970
  Ag at high temp. 1982
  Al–Cu alloy, by repeated blows 3653
  Au, Cu, change of elec. resistivity 3657
  critical shear stress and temp. 3658
  structure of deformation bands 3659
  machine for controlled tensile testing 3666
  slip bands exudation in cyclic stressing 3668
  dislocation theory, survey 3732
  crystals, by glide 4419, 7212
  cold working, Matthiessen's rule validity 4422
  soft polymers, constant stress elongation 4429
  annealed polycrystall. Al, by repeated blows 5141
  Fe, pure, Neumann bands, X-ray microbeam exam. 5736
    residual strains, X-ray invest. 8723
  heat emanation during 5737
  tensor formula, temp. dependence 7213
  α-brass, cold-worked stacking faults meas. 7215
  isochromatic lines in transparent models 7616
  grain boundary behaviour under shear 8712
  crystallography of deformation twins 8762
Plastic flow
  glass at room temps. 1166
  Si and Ge, analysis of measurements 1191
  plasticity conf. rep. 1192
  Al, pure, torsional creep props. 4427
    pure, electron micr. exam. 6252–4
    slip and grain boundary movement 8725
  vitreous B_2O_3 under v. high press. 4435
  slip line field, geometry 5143
  oxide layer, in Cu oxidation 6247
  amorphous and crystall. matls., review 6269
  as type of crystalline rearrangement 6270
  cubic creep function, generality 7218
  and dislocations, in crystals (book) 7275
Plasticity see also *Rheology*
  soil mechanics and plastic analysis 1167
  conference report 1192
  gasdynamical theory appl. 1956–7
  drawing synthetic fibres 1958
  Poisson's coeff. in elasto-plastic phenomena 2766, 6264
  stress deviator tensor deriv. 2768
  high-polymers, solns., normal stress effect 2989
    molec. struct. and kinetic theory interpret. 7222
  residual stresses and strains, moulded plastics 3650
  coking coals, plastic props. 3654
  portal frame modes of collapse, plastic range, model 3656
  instruments for measuring in rubber industry 5142
  of metals at high pressure 5740
  plastic matls., dynamic strength meas. 6274
  elasto-plastic stress-optical effect, AgCl 6678
  allowance for temp. in equations 7213
  crystal, rel. to dislocations (book) 7275
  viscosity props., glasses, review 8710
Plastics
  Plexiglas and polystyrene lenses for u.s. radn. focusing 689
  as insulators, survey 828
  coloured Perspex for darkroom lights 1539
  Lucite-bonded α-scintillation screens, performance 2370
  effect of high-energy radiation, Terylene and Nylon 2789, 7254
    Perspex 8740
  plastic electrets 3287
  moulded, residual stresses and strains 3650
  fibres, friction laws 3670
  photoelast. interference expts. appl. 4747
  secondary anomalous absorpt. region, Perspex 6265
  i.r. dichroism in Nylon 8752

A complete list of the Subject Headings will be found at the end of the Index.

Platinum
- films, covered with dielec. layer, elec. conductivity 218
  - thick, reflectivity and optical const. 4737
  - elec. conductivity phenomena 4797
- elec. resistance increase due to cold work and neutron irrad. 243
- Pt/Pt–Rh thermocouples behaviour, high temps. 813
- asymmetrical temp. grad. thermoelec. effect 1649
- cathodic polarization in electrolysis, discontinuity 2013
- reaction with Ge vapour 3238
- foil, rel. transmission of negatrons and positrons 4835
- polarized Pt electrodes, in HCl, capac. 5756
- thermal cond., low temp., mag. field 6698
- use in vac. u.v. photocell 6796
- bright electrodes, H overvoltage 7248
- oriented overgrowth on mica 7276
- electropolishing 8017

Pleochroism
- i.r. dichroism, rel. to protein and virus struct. 126
- Cotton effect definition 4025
- circular dichroism in crystals 5429
- pleochroic haloes in minerals (book) 7295
- neodymium filters, effect on colour contrast 8349
- i.r. dichroism in synth. polypeptides 8752

Polarimeters
- metal optical constants, dispersion, photog. meas. 157

Polarized light see also *Double refraction; Optical rotation; Photoelasticity; Polarimeters*
- textbook 98
- Te single cryst., i.r., rel. to absorption 145
- evap. metal films, opt. const. det. 158
- elliptically polarized, photoelec. analysis 168
- polarizers for i.r. spectrometry, review 730
- absorption bands, benzene monocrystals 748
  - u.v., pyrimidine 760
  - u.v., anthracene 4711
- optical filters survey 765
  - polaroid screen i.r. filter 4720
- modifications of hexamethylbenzene 1252
- reflected from earth's surface 1352
- inhomog. absorbing medium, wave eq. 2310*
- half-wave plates, demonstrations 3189
- Soleil compensators, calibration 3190
- sky, sunlit, with pure air molecules 3777
  - method of perception 8130
  - method of measurement 8815
- scattering by magnesia 4045
- deflection by electric field 4676
- prod. with thin absorbing layer 4746
- microscopy, effect of objectives strain 4750
  - polarization interferometer appl. 8351
- interstellar polarization, effect in solar corona 5839
- in fluorescence of organic single crysts. 6653

Polarography see *Chemical analysis, polarographic*

Polishing see *Surface texture*

Polyethylene
- solid, statist. theory of crystallite length 371
- cross-linking by high-energy radiation, altered mech. props. 2022, 7211, 7254
  - phys. and chem. changes 2024, 2789
  - effect on density and melting 4455, 7260
  - amorphous state produced 8751
- optical const. from reflect. coeff. ratios 2316
- thermal conductivity 4756
- fusion temp. study 7260
- X-ray induced elect. conductivity 8398–9
- eq. of state for amorphous form, comparison 8751

Polymerization
- ethylene oxide type, modified distrib. functions 525
- inorg. free radicals in soln. 1204
- NaCl dimerization 3490
- acrylonitrile, kinetic study 4457
  - γ-induced 8027
- methyl metacrylate, stages followed by ultrasonic absorption 5343
- N-carboxyamino acid anhydrides, molec. size distrib. 7259
- NaF dimerization, molec. beam mag. reson. data 8039

Polymers
- light scattering studies, 3rd virial coeff. eval. 68
  - reflectance correction 3186
  - random coils, ang. distrib. 5985
  - polydisperse rods, scattering factors 7615
- statist. theory, of crystallite length 371
  - excluded vol. effect in chains 1830
  - stiff chains 2799
- linear high, orientation effect on strength 492
- 2nd-order transition points meas. 1576
- dielectric props. and breakdown 1619
- solid, viscosity and self-diffusion 1963
  - self-diffusion meas. 1965
- thin film prep. for nuclear physics use 1967
- cross-linking due to high-energy radiation, ph changes 2022, 6219, 7211, 7254
  - long-chain, phys. and chem. changes 2024, 278
  - Polythene, density and m. pt. changes 4455, 7
  - effect in Perspex 8740
  - long-chain, amorphous state produced 8751
- phase separation of polymethylacrylic esters 2033
- u.s. study, swollen Buna-N rubber 2263
  - high polymers 4024
- real polymer chains, interaction effects 2602
- relaxation times det. from rebound elasticity 276
- nitrocelluloses, intrinsic viscosity det. 2985
- solutions, hydrodynamics 2989
  - polymethyl methacrylate 3005
- glasses, heat of solution 3274
- polyelectrolytes, molecular configuration 3484
- vol. effect in polymer chains 3517
- high, elasticity modulus temp. dependence 3646
- adsorption, statist. mech. theory 3697
- crystall., synthetic, morphology 3703
- soft, constant stress elongation 4429
- *r*-mer liquids, cell method appl. 3916
  - statist. theo. 3917
- stress relaxation, in elastomers 4454
  - in polymeric media 6984
- polystyrene, thermal degradation 4458
- absorbed water det. with i.r. spectrometer 4694
- solution, viscosity mechanism 5317
  - polystyrene/diethyl benzene 3900
  - conc. solns., flow double refract. invest. 5316
  - rel. to mol. wt., inhomogeneity effect 6302
  - polyisobutylenes, degradation on shearing 803
- crystall., melting, rotational-isomerism theory 57
- viscoelastic props., dil. solns. 5872
  - dil. solns., coiling polymers 6510
  - polyisobutylene, models 7206
- polymethyl methacrylate, secondary anomal absorpt. region 6265
- dynamical props. study, high polymers 6266, 720
  - polyisobutylene 7207–8
- high, thermal expansion 6303
- triboelectric props., polyvinyl chloride 6747
  - polar, polymers 6749
- in low-temp. lubrication 7225
- diffusion of solutions, rate rel. to conc. 7499
  - with Langmuir-type absorpt. 8266
- electron emission in stripping film from glass 770
- long chain molecules calc. 7828
- films, X-ray diffraction patterns 7976
- linear, biaxial orient., effect on strength and craz 7998
- degradation by γ-rays and neutrons 8025
- intermolec. attraction, effect on strength 8040
- velocity of sound in high polymer liquids 8287
- *cis*- and *trans*-polydiene, chain length 8631
- amorphous, long-chain, eq. of state comparisons 87
- i.r. dichroism in Nylon 8752
- horse haemoglobin, polypeptide chains? 8801

Polynomials
- Zernicke circle, occurring in diffraction theory 23
- zeros, and linear system stability 3781
- Legendre, summing tech., multiple scatt. appl. 37
- Chebyshev, operators, in boundary-value proble 3784
  - tables of $Sh(x)$ and $Cn(x)$ 3785
- fitting to unequally spaced observations, errors 58

Polystyrene
- focusing lens for u.s. radn. 689
- pure, solid, light scattering 782

ystyrene—*contd.*
- fast electrons in ionization, loss and straggling 902
- plasticized, self-diffusion meas. 1965
- Dow latex 580 G, resuspension by ultrasonics 2029
- relaxation time det. from rebound elasticity 2763
- cross-linking due to high-energy radiation 2789
- light scattering study, reflectance correction 3186
- heats of solution, rel. to vitreous state 3274
- and derivs., dipole loss 3292
- polystyrene/diethyl benzene, bulk viscosity 3900
- unplasticized, decontamination from fission products 4334
- thermal degradation 4458
- elec.-resistivity increase when irradiated 4810
- viscosity, rate of shear effects 5874
- heat of soln. rel. to phase change 6304
- dichlorethane diffusion 6531
- elastic constants from torsional vibrations 7209

ythene see *Polyethylene*

osity see also *Permeability, mechanical; Surface measurements*
- in dezincified brass 480
- Cu–Ni alloys, lattice vacancies 1168
- development during diffusion in substitutional solid solns. 1172
- det. by capillary method 1173
- zircons, for He, after α-particle damage 1426
- H transmission through Pd by electrolysis 2752
- porous heat sources, numerical method 3233
- sintered material, review 3627
- synthetic graphite, closed pores and density 3633
- saturated soil, meas. *in situ* 3634
- size distribution in porous rock 5727
- sound propagation in porous medium 5912
- consolidation round pore pressure meters 7197

itive electrons see *Electrons*

itive rays see *Chemical analysis, positive rays; Ion beams*

ources see *Ion sources*

itrons see *Electrons*

assium
- K_2HgCl_4 crystal proton mag. resonance 379
- $gj(^2S_{\frac{1}{2}})$ in terms of proton gyromag. ratio 388
- K^{40} branching ratio and geol. age det. 410
- chromicyanide, paramag. resonance 968
- heat of fusion, transformation press. effect 1577
- change of vol. on melting, rel. to transform. press. 1578
- azide, thermal decomposition, exciton mech. 2001
  - photolysis kinetics, exciton mech. 2017
  - ionic conductance meas. 8015
- intense drying of gases appl. 3705
- K–Sb, K–In systems, semicond. props. 6042
- ions, reflection from metals 6100, 6102–3
- low-temp. thermoelectricity study 7690

assium alum
- KCr alum, adiabatic demagnetization results 1589
  - paramag. relaxation 2542
  - refrigerator appl. 8377

assium bromide
- colour centres, at 5°K 1251
  - and trapped charge 4478
  - coloration of sensitized crysts. by X-rays 6651
  - and KBr–KCl, *F*-band position 8776
  - KCl–KBr mixed cryst., *V*-band position 8778
- refract. index for i.r. radiant energy 2317
- refractivity 3091
- high temp. enthalpy det. 6734
- surface structure of single crystal 7285

assium chlorate
- decomp. by X-rays 5772

assium chloride
- thermal conductivity, atomic admixtures infl. 796
- colour centres, at 5°K 1251
  - and trapped charge 4478
  - and mag. susceptibility 1°K to 300°K 4903
  - KCl–KBr, and KCl–RbCl, *F*-band position 8776
  - KCl–KBr mixed crystals, *V*-band position 8778
- elec. strength, factors influencing 1620, 6759
  - elec. strength temp. rel. 3342
- vapour pressure, evaporation rate 6709–10
- surface structure of single crystal 7285

assium chromate
- solution, as u.v. transmittancy standard 2359

Potassium iodide
- photoelec. emission assoc. with β-band absorpt. 232
- oxidation by ultrasonics, rel. to wavelength 2018
- high temp. enthalpy det. 6734

Potassium permanganate
- rendering visible elec. charges formed during diffusion, appl. 3007*
- changes under electron bombard. rel. to thermal decomp. 5137

Potassium phosphate
- dielec. const., 9500 Mc/s, rel. to temp. 831
- KH_2PO_4, props. below Curie point 4073
- KH_2PO_4 domain struct. 4481

Powders see also *Granular structure; Particle size; Sintering; Surface measurement*
- small glass spheres prod. and sep. 479
- powder film appl. as optical filter 765
- crystall., optical absorpt. by diffuse reflectance 1536
- quantitative expression of mixing 2249
- metal, in paraffin wax, artificial dielectrics 3291
- sintering, review of theory 3627
  - diffusion importance 3628
- dense random packing of unequal spheres 3629
- impact energy absorpt. by pulverization 3892
- metal carbides, borides, nitrides, hydride, supercond. studies 4107
- surface area by ion exch. method 4629
- iron-oxide, magnetic props. 4906
- electron images eval. 5135
- powder reactions in silicate systems, radioactive indicator study 5158
- patterns, meth. of time interval meas. 6505
- pyrophoric Fe, X-ray study 7320
- compressed, metal, self-diffusion and flow 7967
- ferromag., particle size meas. 7974
- atm. collection without disturbing agglomeration 8123
- fine, ferromagnetic, texture rel. to props. 8572
- fine, thermoremanent magnetization 8580
- cloud, total charge and mass meas. 8744

Praseodymium
- elec. resistivity, low temp. 840

Praseodymium oxide
- Pr_2O_3, paramag. neutron scattering 8527

Pressure see also *Atmospheric pressure; High-pressure effects; Radiation pressure; Vapour pressure*
- in a liquid, intermolec. forces 2236
- internal, liq., rel. to acoust. resist. 3898

Pressure measurement see also *Manometers; Vacuum gauges; Vapour pressure measurement*
- pulsating press., wire resist. method 2983
- capacitance gauges, temperature-stable 2984
- press. change in bomb 3152
- small differences, comparator 5314
- pore press. meters, consolidation round 7197

Prisms, optical
- Amici, graphical solution appl. 1482
- variable unit for range finders 1485
- CsBr, infrared 2328
- absorption effect on resolving power 3966
- resolving power, not at min. dev. 5376

Probability see also *Errors; Random processes; Statistical analysis*
- binomial distrib. tables, to 6 places 4
- normal density, narrow band noise approach after nonlinear device 212
- entropy concept in probabilities calc. 636
- continuous information, theory 1334
- density value in quantum theory causal interpret. 2180
- guide to tables 2900
- sampling theory 2901
- nonstationary stochastic processes, prediction theory 2902
- role in Bohm's quantum theory interpretation 2939
- of delay, telecomm. systems 3793
- interacting particles struct. function expression 3932
- quantum absorpt. rel. to grain vol., photog. 4542
- recurrence and first passage times 5832
- meaning of concept 7463
- random divisions of line, stochastic processes 8180
- stochastic problem rel. to counters 8181
- capacity in a noisy channel 8182

Projectiles see *Ballistics*

Projectors, optical
- projecting profile at a given cross-section 6687
- performance rel. to lamp's useful flux 6688
- colour transparency illuminators 8174

Prominences, solar see also *Astronomical spectra*
- flares, analogies with lightning and lab. discharges 246
- chromosphere at border, cine-film study 1341
- filaments, sudden disappearance, cause 1342
- propagation of eruption-activity 1343
- photometric survey in Hα light 2151
- photographic study, isophotal densitometer appl. 2309
- chromospheric line width, interferometric eclipse meas. 2913
- coronal, noise from 3803
- H and ionized Ca ejection at flare onset 3809
- chromospheric H, anomalous excitation 3810
- chromosphere, H atoms in 2nd state 3811
- H $2^2S_{\frac{1}{2}}$ state lifetime in ionized atm. 3816
- model H chromospheres, radiation charac. 3817
- magneto-hydrodynamic shock waves 3999
- electric discharges in flares 7386
- electron temperature of eruption 7402

Propagation see *Acoustic wave propagation; Electromagnetic wave propagation*

Propane
- cyclopropane, dissoc. under electron impact 999
- reaction with $Cd(^3P_1)$ at low conversion 1211

Propylene
- cyclopropene dimensions 1018
- thermodynamic properties 6537

Prospecting see *Geophysical prospecting*

Proteins
- crystalline, density meas. 529
- muscle, light scattering meas. method 784
- advances in X-ray analysis 2084
- crystallography, cut-off phenomena 2085
- electron microscope specimen prep. 2762
- struct. in soln. and denaturation effect 3132
- unit cells of 4 proteins 3751
- struct., u.v. absorpt. study 4024
- solid, dielectric props. at cm wavelengths 6753
- adsorption on, rel. to interactions in soln. 8041
- haemoglobin, 10 Å reflections, strength calc. 8086
  - horse, rod-like structures? 8802
- scale models for molec. struct. study 8630

Protoactinium
- magnetic properties 322

Proton spectra
- from $Na^{23}(d, p)Na^{24}$ 1120, 8683
- $Al^{27}(d, p)Al^{28}$, magnetic anal. 1123
- $F^{19}(d, p)F^{20}$, magnetic anal. 1914
- *d*–Be reactions, magnetic anal. 2698
- $Sr^{88}(d, p)Sr^{89}$, magnetic anal. 2699
- from Pb^{206-8} (*d*) 2700
- D photoprotons 2704
- Harwell cyclotron 6858
- Si^{28} and Si^{32} (*d*, *p*) 7126
- Ca^{40} and Sr^{88} (*d*, *p*) 7127
- $Mo^{92,\ 100}$ photoprotons 7144
- O^{18} (*p*, α) 7916

Protons see also *Cosmic rays, protons; Nuclear reactions, protons*
- binding energies, in light nuclei 375
  - survey 4960
- proton shells, heavier nuclei, rel. to α-energy systematics 373
  - closed, in nuclei with $Z > 50$ 4271
- gyromag. ratio in K^{39} ground state *g* value det. 388
- high-energy, detection, organic phosphors appl. 930
- low-energy delta rays prod. 1064
- bombardment effect on Ag self-diffusion 1171
- encaged in H^+ ion in aq. soln.? 1213
- electron capture in H 2515
- diffraction theory 2837
- thermo-e.m.f. induction in iron and constantan wires 3320
- 31·5 MeV, statist. fluct. in ionization by 3388
- collision, π^+ meson prod. 3614
- detonation of proton gas 4347
- isobaric states, and π-meson scatt. 4378

Protons—*contd.*
- high-energy, interaction with C nucleus 5700
- magnetic spectrometer, focusing props. 6862
  - line broadening elimination 6863
  - ionizing capac. meas. 6898
- from D + D, polarization, theory 7133
- distribution in atomic nuclei 7836
- 1·7–3 MeV, on Mo, Ag, Ta, Au, Pb, characte X-ray prod. 7920
- scattering of pions, polarization of proton 7957
- biological irradiation, single cell 8138
- fluorescence in KI(Tl), by bombardment 8338
- interaction with α-rays in $Bi^{212}H_3$ molecule 865
- from nuclear disintegrations in emulsions 8680
- **absorption**
  - range straggling evaluation 274
  - radiative capture by Be, resonant energies 432
  - knock-on protons from fission, energy loss 1927
  - capture probability in Na, Mg, Al 2672
  - proton-γ resonances below 500 keV 2687
  - range-energy rel. in emulsions 3370
  - radiative capture in F 3577
  - in Al, mean excitation potl. study 4153
  - radiative capt. by B, C, F, Mg, Al, resonant ene det. 4349
  - energy loss in metallic foils and mica 4873
  - low-energy, energy losses in some gases 4874
  - range/energy in air, intermediate energies 5528
  - energy loss in H, He, air, A 6868
  - one-body resonance half-width calc. 7132
  - rel. stopping cross-section in Li 7919
  - ionization at relativistic energies, polarization ef 8451
- **angular distribution**
  - from $Cl^{35}(d, p)$ 376
  - $He^3(d, p)He^4$ 1117, 4355
  - from $Be^9(d)$ 1122, 3583
  - from D(*d*, *p*)T 1124
  - from $Be^9(p, p')Be^{9*}$ 1691
  - 6·5 MeV, elastic scatt. from Cu 2500
  - from $F^{19}(d, p)F^{20}$ 2697
  - photoprotons from D 2704, 7932
  - $Al^{27}(d, p)Al^{28}$, app. and results 3592
  - (*d*, *p*) stripping reaction, Mg isotopes 3593
  - $Li^6(d, p)Li^{7*}\gamma Li^7$, *p* and γ ang. correl. 3594
  - from $V^{51}(d, p)V^{52}$ 3595
  - recoil from neutrons, organic scint. detectors a 4150
  - from nuclear photoeffect, calc. 5702
  - Si^{28} and S^{32} (*d*, *p*) 7126
  - Ca^{40}, Sr^{88} (*d*, *p*) 7127
  - polarization in (*d*, *p*) and (*d*, *n*) reactions 7128
  - Mo^{100} and Mo^{92} photoprotons 7144
  - from $Na^{23}(d, p)Na^{24}$ 8683
- **production**
  - in high-energy nuclear photoelectric reaction 44
  - as shower particles in high-energy nuclear dis grations 944
  - photoproton, high-energy, by 322 MeV bremsst lung 2705
- **scattering**
  - Univ. of Pittsburgh scattering project 270
  - multiple, in emulsions, fast 271
    - 147 MeV, in thin foils 4149
  - 31·5 MeV, from Be, C, Al, Pb, Pt 273
  - *p*–T, phase shift analysis 912
  - elastic, by He^4 1689, 1692
    - 6·5 MeV, from Cu, ang. distrib. 2500
    - by He^3, 2·5–14 MeV 7155
    - by Li 7919
  - on Be^9, inelastic, angular dependence 1691
  - large-angle, by atoms, electron ejection 1851
  - $C^{12}(p, p)C^{12}$ differential cross-section 2688
  - high-energy protons, double scatt. by C and 7730
  - total cross-sections for H and light elements 867
  - **proton-deuteron**
  - differential cross-section 1–3·22 MeV 272
    - 9·7 MeV 911
  - *p*–*d* at 5·1 MeV and *d*–*p* at 10·2 MeV 1690
  - high-energy, elastic, Jastrow's interaction 2498
  - elastic, phase shift calc. 7188
  - **proton-neutron** see *Neutrons, scattering*

ons—*contd.*
ttering—*contd.*
proton-proton
differential cross-sections, 9·7 MeV 911
high-energy, assoc. polarization effects 913
Coulomb and nuclear scattering, interference 1905
phase shift energy dependence 2499
high-energy, interpretation 2501
polarization effects 2502
at intermediate energies 3368
high-energy, charge independence 3369
for nucleon isobar model 4871
for small energies, cross-section 4872
elastic, at 435 MeV, differential cross-section 6095
from 1·8 MeV to 4·2 MeV 6096
data analysis, *s* and *p* waves 6097
32 MeV, exp./theor. comparison 6098
ps see also *Vacuum pumps*
centripetal air pump, cross-viscosity effect 73
d.c. electromagnetic, for liq. metals transfer 5580
centrifugal pump cyclotron target assembly 7119
a.c. electromag., for lab. liq. metal pumping 8042
dine
molec. dimensions, microwave invest. 7573
meters
metallurgical technique (book) 482
brightness temperature, simplified 2424
full radiation, for 0° to 100°c range 4768
radiometer for intense radn., direct meas. 6012
optical, sector disk centring errors effect 6590
fast, electro-optical, hot gas 6732
hotite
magnetic behaviour 1746
ferro- and antiferromagnetic props. invest. 8532
ntum theory see also *Electron theory; Field theory, quantization; Fundamental particles; Statistical mechanics*
information in quantum measurements 57
unification with unitary theories 600
analytical characterization of physical quantities 1369
quantum mechanics, axiomatic foundation 1370
analysis of basic concepts 1371
Markoff chains, rel. to quantum processes 2176
causal interpretation, probability density value 2180
non-relativistic (book) 2181
Feynman's particle path formulation, modification 2935
operator deriv. and total differential 2937
in light of distribution analysis 2938
Bohm's interpretation in terms of "hidden" variables 2939
students' text-book 3852
Lagrangian quantum mechanics, commutation relations 3853
quantum of action, significance 3854*
quanta conservation for nonlocal fields 3856
elementary particles, fundamental processes, statist. invest. 4588
non-relativistic, objectivity of states 4589
Einstein's apparent contradiction of indeterminacy 5305
deriv. from classical, causally determined model 5849, 8210
significance of quantum of action 6450
Bohr's interpretation defended 6451
survey of Bohm's interpretation 6452
density matrix in the Hartree field 6453
statistical model for basic processes 6468
perturbation expansions, new proof 6482
time-singularity, use of homogeneous formalism 7423
quantum spectrum of masses, lengths and time 7425
electrodynamics, current density 7433
structural basis of classical and qu. mechanics 8211
qu. eqns. of motion and commutation relations 8212
the dynamical principle 8213
2nd quantization methods 8220
3-particle Coulomb problems 8236
plications
variational method for radiationless transitions 25
theory of matter (book) 26
light (textbook) 98
assemblies of interacting particles 202
radiation from accelerated relativistic electrons 882

Quantum theory—*contd.*
applications—*contd.*
ferromagnetism, quantum statistical treatment 951
use of term "wave function," not "electron," in theoret. chem. 997
polarons, theory 1249
ferromagnetism origin, new theory 1741
virial coefficients 2260
irreversibility, quantum and classical problem 2936
electron optics (book) 3347
internal photo-effect 3473
He viscosity coeff. 4058
reaction rates calc. 4443
Boltzmann's equation 4658
radiating electron 5521
dipole moments calc. 5646*
spectral line broadening 5951
transition point freq. dependence, superconductors 6804
idealized crystal polarizability 7292
gravitation, electromagnetism, electron, 5-dimensional theory 7424
line width of Rayleigh scattering in gas 7611
chemical bonds and electrons in molecules 8036
to classical statistical mechanics 8221
spin-wave theory, antiferromag. appl. 8518
transition metal structure 8611
radiation see *Cherenkov radiation; Electrons, radiation; Field theory, interactions; Radiation, theory*
***S*-matrix theory**
S-matrix and nucleon isobar 51
group theoretical aspects 53
equivalence of two definitions 1387
bound states in weak interaction 1389
divergent perturbation expansion 1391
radn. scatt., non-relativistic theory, rôle of spin 1392
4-dimensional representation, bound-state perturbation 2193
S-matrix symmetry 2204
phase shift and scatt. potl., rel. 2209
deuteron stripping reaction theory 2696
well-ordered *S*-matrix 2952
S-matrix method in pion reactions 2955
and causality condition, Maxwell field 2960
photon scatt. by e.s. field 3883
steady states and *S*-matrix 3884
derivative matrix and scatt. matrix 4606
nuclear dispersion, boundary conditions and *S* formalism 4607
asymptotic description of scatt. processes 5856
polarization due to nuclear reactions, calc. 5864
noncentral force matrix elements, nuclear d^2 config. 6480
rel. to formal theory of scattering 7456
S matrix poles for reson. reactions 7460
for relativistic system of interacting particles 8234
spinor equations
wave eq. in de Sitter space 39
transform. laws representing Dirac's eq. solns. 615
spin wave eq. correspondence theory 616
formulation of β-decay and similar interactions 1385
spinors and tensors from Dirac's eqns. 7443
non-local field eq. deriv. 8230
wave mechanics
variant integral assoc. with wave eq. 2
limitations of concept. of intrinsic parity of elementary particles 24
equivalent potentials 55
velocity operator 56
reality problem in quantum mechanics 601
particles and wave fields, appl. (book) 602
scattering by rigid sphere, transient effects 625
singularity and statist. wave rel., unitary relativistic theory 631
shutter problem and relativistic scatt. process 632
de Broglie wave, molec. struct. study appl. 996
electron motion in Hg atom field 1038
iterative procedures He wave eq. 1039
removal of "idealistic" features 1371, 3855
wave-pilot theory, forces for spin 0, ½ and 1 particles 1393
wave mechanics in configuration space 1395

Quantum theory—*contd.*
- **wave mechanics**—*contd.*
  - particles in config. space, double-solution theory 1396–7
  - wave packet passage through potl. barrier 1398
  - causal interpretation 2178–9
  - amplified Dirac eq. conversion 2192*
  - 1st-order meson wave eq. 2961
  - error calc. in quantum chemistry 3488
  - divergence of perturbation expansion 3885
  - Schrödinger–Gordon eq. 3887
  - props. of Racah and assoc. coeffs. 4246
  - Dirac function appl. 4551
  - radial deuteron eq., asymptotic eigensolutions 4619
  - perturbation eq., form of probabilities 4620
  - nonlinear wave eq., movable critical points 4621
  - extension to non-Hamiltonian systems 4622
  - comparison with triple-wave theory 5289–90
  - definition of relativistic particle–antiparticle wavefunctions 5304
  - restrictions upon Maxwell's demon? 5308
  - tropospheric propagation analogy 5590
  - potential barriers, elec. model 5865
  - momentum space wave functions, deuteron ground state 5866
  - interpret. using waves with singular regions 6483
  - Schrödinger eq., numerical solution 6484
  - WKB-type approx. to Schrödinger eq. 6485
  - relativistic 2-particle wave eq., reduction to approx. forms 6486
  - potential barrier props., circuit theory analogy 6487
  - annihilated photon, wave function 6488
  - correspondence with statistical mechanics 6489
  - elect. polarizability of molecules 7020
  - alpha-disintegration, wave-statistical theory 7083
  - new eq. for spin $\frac{1}{2}$ particle 7441
  - tensors from Dirac's eqns. 7443
  - struct. and mass spectrum, elementary particles 7448
  - meaning of wave functions 7463
  - potl. det. from asymptotic phase, uniqueness 7464
  - representations of the Galilei group 7465
  - Dyson–Feynman operator $U(t)$ 7466
  - wave function approx. forms, integrals calc. 7467
  - causal interpretation 7468
  - particle motion across potl. jump, optical analogy 7469
  - generalized self-consistent field method 7850
  - Schwinger's variational principle, appl. 8229
  - perturbation, modified propagation functions 8239
  - of rigid electrons, and Lamb shift 8240
  - inverse perturbation 8241
  - a formulation assoc. with classical models 8242
  - paramagnetic resonance, review 8566

Quartz
- i.r. spectrum, frequency directional variation 129
- transparency rel. to temp., Schumann region 140
- melting in centrifugal solar furnace 184
- elastic wave propagating charac. at 15 Mc/s 687
- resonance up to 5000 atm. 835
- crystals, interferometric exam. of faces 1238
- structure, i.r. reflection study 1519
- piezoelec. oscillations, even and half-odd harmonics 2440, 8279
  - surface vibration 7530
- lattice expansion by fast neutron bombard. 2826
- helix balance, construction improvements 2979
- luminescence due to α-particle irradiation 3174
- internal friction 3673
- quantitative det. by X-ray diffraction 4461
- cracking during thermal transformation 5203
- fibre manometer, theory 6509
- crystalline, surface layer 8764
- plates, ref. data for orienting by X-ray diffract. 8781

Radiation see also *Acoustic radiators; Bremsstrahlung; Cherenkov radiation; Electromagnetic waves; Electrons, radiation; Emissivity; Stars; Stellar structure; Sun, radiation; Sunlight*
- ultra-violet, text-book 2394
- colour temp. of luminescence of high-press. argon 5406
- measurement, concepts suitable for whole e.m. spectrum 7537

Radiation—*contd.*
- **heat**
  - absorpt. and scatt. by large-drop water sprays 1
  - low temps., thermodynam. treatment breakd 2305
  - ignition of wood 3249
  - in presence of absorbing and dispersive medium, 5436
  - flames (book) 7627
  - role in heat conduction process 8354
- **theory** see also *Field theory, interactions*
  - "radiation principle" and wave eq. soln. 86
  - radiation sphere in Einstein universe 3079
  - resonance excitation in Hg vapour by light 4678
  - blackbody radiancy eval., nomogram 4680–1
  - and theory of images 5369
  - general theory of damping phenomena 6463–4
  - multipole, angular momentum 6465
  - multipole radiation 7896
  - fields with central symmetry, in gen. relativity 82

Radiation chemistry see *Chemical effects of radiati Radiochemistry*

Radiation detectors see also *Bolometers; Photome Radioactivity measurement; Thermopiles*
- i.r., recent progress, review 730
- industrial spectroscopy colloquium 1488
- u.v. radiation (book) 2394
- electronic telescope 4557
- surface temp. meas. appl. 4767
- radiometer for intense thermal radn. direct me 6012
- calibration for extended-source measurements 65
- fluctuation theory, review 8199
- Moll thermopile method, sampling errors 8380

Radiation monitoring see also *Dosimetry*
- survey meters, pocket dosimeters, etc., X-ray c bration 2640
- ground contamination, aerial surveying 2642
- X- and γ-ray, film charac. rel. 2643
- fast neutron flux near 23 MeV betatron 2744
- conference report 4535
- method of increasing resistivity of irradiated in lator 4810
- flame proofing equip. 4875
- X-ray film badges 5522
- two commercial types 5534
- photovoltaic detector 6831
- α-radioactive aerosols 7856
- safety in nuclear reactor operation 7946
- personnel, medical and industrial, conf. rep. 8152

Radiation pressure
- in expansion of the universe theory 580
- thermal Rayleigh disk, He^3–He^4 mixture measu ments 3261
  - effect of He^3 ingredient 192
- in planetary nebula 3819
  - He II problem 3820
- acoustic, physics of 5910
  - portable u.s. output meter 699
  - on circular disk 700
  - compression waves in stellar atmospheres 2160
  - two components, dispersive media 2287, 6571
  - rel. to energy density, 2nd-order fields 3048
  - acoustic wave momentum and inertia props. 65
- light, theory and expt. review 6579

Radiation protection see also *Radiation monitoring*
- radioactive waste, filter beds, efficiency 1098
- industrial hazards of microwave radiation 1317
- protective agents, mode of action 2117
  - for X-rays, Co, mech. 4534
  - for X-rays, β-mercaptoethylamine and thym extract 8151
  - for u.v. radn., Na thioglycolate 6347, 8829
- remote handling engineering 2634
  - general-purpose remote manipulators 2635
  - manipulation, force-reflecting positional ser mechanism 2636
- shielding windows, design and construction 2637
  - glass, coloration by radn 2638
- faulty X-ray technique, detect. by direct meas. 28
- cyclotron personnel, lymphocytes with bilobed nuc 2868
- handling of radioactive substances 4333

- **adiation protection**—*contd.*
  - medical and industrial, conf. reports 4535, 8152
  - nuclear reactors, design considerations and monitoring 7946
  - special shielding concretes 7962
  - max. permissible radioisotope conc., human body 8150
- **adioactive dating** see *Radioactivity, dating*
- **adioactive disintegration theory** see *Nuclear decay theory*
- **adioactive tracers** see also *Chemical analysis, radioactive*
  - evap. films, contamination by source invest. 484
  - continuously recording radioactive haemoglobinometer 1304
  - gas streams, turbulent mixing study appl. 1435
  - S^{35}, methods of using 1901
    - surface adsorption meas. 8745
  - Na^{22}, Na enclosure in KNO_3 study 2042
  - I^{131}, in amyl iodide, metal surfaces autoradiog. 2128
    - vapour, in airstream 8269
  - samples containing two, radio det. 2644
  - leak locating, diffusion in ground 2682
  - vertical density distrib. of Xe near crit. pt. 3245
  - diffusion in solids invest., metals 3631
    - C^{14}, graphite self-diffusion 1170
    - self-diffusion in Ag under cyclotron bombard. 1171
    - ion diffusion through metallic coatings 1215
    - Sb diffusion in Ag crystals 1959
    - self-diffusion in solid polymers 1965
    - self-diffusion in $CaO.Fe_2O_3$ 4402
    - self-diffusion $BaTiO_3$ 4405
    - In distrib. coeff. in Ge 4407
  - irradiated carbide cutting tools wear meas. 4432
  - radiography of human body 4539
  - tagged spherical clay particles prep. 5050
  - preparation, meas. and use (book) 5051
  - course in radioactive determinations 5052
  - appl. in pharmacological research 5053
  - powder reactions in silicate systems invest. 5158
  - use in chem. dosimetry 5826
  - T-labelled liquids, scintillation counting 6885
  - Mg^{28}, chlorophyll invest. appl. 7118
  - studies in glass polishing 7194
  - C^{14}-labelled CO in Fe carbiding study 7231
  - press. effect invest. in CCl_4–SnI_4 diffusion 7495
  - max. permissible conc. in human body 8150
  - Ge acceptor mech. invest. with radioactive Cu 8406
  - modified isotopic exchange rate expression 8729
- **adioactivity** see also *α-, β-, γ-rays; Atmosphere, radioactivity; Chemical analysis, radioactive; Chemical effects of radiations; Geophysical prospecting, radioactive; Nuclear decay theory; Nuclear excitation; Nuclear reactions; Radiochemistry*
  - high voltage generation by radioactive matl. 428
  - statistical fluctuations in radioactive phenomena 1043
  - recoil appl. in nuclear processes 1861
  - α-, in 82-neutron region 1877
  - polymer films as radioactive source supports 1967
  - short-lived isomers study 2662
  - β- and γ-absorption thickness gauge, paper mill appl. 2683
  - degree of coherence in interior of radioactive distribution 3553
  - astatine occurrence in nature 4308
  - disintegrations, effect on atom inner electrons 4332
  - polystyrene decontamination from fission products 4334
  - ampelites, nuclear emulsion invest. 4976
  - active deposit on metallic plaques, distrib. figures 4977
  - surface rocks, penetrating radn. meas. 5231
  - in Switzerland, survey 5667
  - induced by explosions, explanation 5699
  - geological applications 5796–7
  - complete table of nuclides with characteristics 7061
  - external field influence on ang. correl. 7092
  - radioactive static eliminators, Tl^{204} appl. 7649
  - of Etna lava 7855
  - anal. of ang. correl. and ang. distrib. data 7857
  - β-decay, nucleon isobar as intermediate 7888
  - irradiated glass sphere study of elec. precipitation 8031
- **Radioactivity**—*contd.*
  - A^{37} decay, daughter atom charge 7861
  - A^{38} in pitchblende minerals, nuclear reaction origin? 6193
  - Am^{241} γ-radiations 4322
  - As^{77}, 2 new γ-rays 7105
  - Au *K*-series, internal conversion probability 426
  - Au^{198}, cascade γ-rays ang. correl. 5030
  - Ba^{137} $M4$ transition energy and $K/(L + M)$ ratio 425
  - $Ba^{128,129}$ 7869
  - Be^8 breakup energy 7862–3
  - Bi, natural 2653
  - Ca^{46}, neutron activation 6232
  - Cd^{111} $M4$ transition energy and $K/(L + M)$ ratio 425
  - Ce^{141} *K*-shell conversion coeff. 422
  - Co^{60} γ-ray irrad. chambers for chem. research 4298
  - Cs isotopes, γ-ray study 7867
  - Cs^{128} 7869
  - He^6 decay, electron and recoil nucleus correl. 3560
  - I isotopes, γ-ray study 7867
  - $In^{113,115,114}$ $M4$ transition energy and $K/(L + M)$ ratio 425
  - Io, α-ray fine structure 7878
    - coincidences 8655
  - La^{142} 7868
  - Li^8, ang. correl. 3555
  - Li^9 disintegration in an emulsion 2648
  - Mg^{28} 7876
  - Mo^{93}, 7 hr, isomer identification 4300
  - N^{16}, search for 1-MeV γ-radn. 6202
  - Na^{22}, high and low-energy spectra decay const. ratio 4994
  - Ni^{60}, γ-γ ang. correl. 7895
  - P^{32} β-decay, inner bremsstrahlung 2665–6
  - $Pa^{231} \xrightarrow{\alpha} Ac^{227}$, elec. dipole radn., period det. 7893
  - $Po^{210}(RaF)$ α-disint., internal ionization 7859
  - Pm^{145}, α-instability 5680
  - Pu^{239}, soft radiation 1097
  - Ra γ-transitions 1897
  - RaD, γ-rays 1081
    - e.m. spectrum 4326
  - RaE electromagnetic radiation 4325
  - RdTh γ-transitions 1897
  - Re, natural, nuclear emulsion invest. 4980
  - Rh neutron-deficient isotopes 3584
  - $Rh^{102,\ 104}$, decay energies from mass spectra 7053
  - Rn absorpt. in nuclear emulsions 8165
  - Sb^{124}, reinvestigation 1083
    - β–γ ang. correl. 8660
  - Si^{32} 7876
    - in natural Si, search 4299
  - Sm^{147}, α-instability 5680
  - Sn^{113}–In^{113} transition, γ-radiation 4320
  - Sn^{124}, double β-decay search 6207
  - Sr isotopes, neutron deficient 1057
  - Sr^{87} $M4$ transition energy and $K/(L + M)$ ratio 425
  - Sr^{87}/Sr^{88} variation in Rb minerals, age det. appl. 2630
  - Th and products, activity rel. to time 393
  - Ti^{51} disintegration energy 1872
  - U^{234-6}, specific α-activities 1059
  - V, natural, negative search 3541
  - Xe isotopes, γ-ray study 7867
  - Xe^{131m} decay, daughter atom charge 7861
  - Y^{87}, Y^{91} $M4$ transition energy and $K/(L + M)$ ratio 425
  - Y^{91}, continuous γ-spectrum 2665
  - Zn^{65}, scint. spectrometer study 7070
  - Zr^{96}, double β-decay search 6207
  - **artificial production** see also *Nuclear reactions*
    - Fe^{59}, techniques 427
      - by $Co^{59}(n, p)$ 3603
    - induced in C by fast He^3 ions 431
    - Si^{31} 1052
    - S^{35} 1901
    - experimental techniques (book) 2633
    - method of time-free solutions 2647
    - Cr^{55}, from $Cr(n, \gamma)$ and $Mn^{55}(n, p)$ 2654
    - Rb^{84m} 2659
    - As^{70} 3550
    - Mg^{28} 3554, 4997
    - Rh neutron-deficient isotopes, *d* on Ru 3584
    - Mg heavy isotopes 4302
    - radioactive isotope production (book) 5051

Radioactivity—*contd.*
  artificial production—*contd.*
    by 6·7 MeV H^3 and 21 MeV He^3 cyclotron bombardments 5066
    Br^{82} 5674
    Mo^{93m} 7074
    2·5 min Ga^{64}, by (*p*, *n*) on Zn^{64} 7078
    P^{32}, large scale, in pile 7116
    for γ-ray therapy 7117
    As^{76} from $(CH_3)_2$ AsOOH, Szilard–Chalmers 7905
    v. high spec. activity Zn^{65} source 7906
    Co^{60}, self-shielding and flux depression 8690
  dating
    K^{40}/A^{40} method, microcline appl. 410
      allowance for A diffusion 6327
    radiocarbon methods (book) 1276
      automatic counter appl. 926
      Lamont, natural, list of specimens dated 1046
      natural, proportional counter appl. 1048
      sample prep. and counting tech. 2646, 3538
      review 2839
      new technique 3764
      meas. as CO$_2$, gas counters 6878
  decay periods
    nuclear isomers, for γ-transitions, calc. 2650
    ultra-short scint. detectors, meas. appl. 4163
    noble gas metastable states 4290
    short-lived isomeric transitions search 4307
    theory of radiative lifetime 4979
    accurate half-life det. methods 4981
    short-lived decay products, eval. from delayed coincidences 5671
    method for short β-decay lifetime meas. 6195
    short period states, delayed coincidences study 7063
    nomogram lifetime-energy-spin, γ-ray transitions 7099
    AcC″ 2651
      upper limit, mean life 7879
    Al^{28}, automatic recording electroscope method 7062
    As^{70} 3550
    As^{71} 7086–7
    As^{77} 8653
    As^{79} 7938
    At^{218} 5006
    Au, neutron-excess isotopes 1868
    Au^{198} 4982
    B^{12}, meas. method 4978
    Ba$^{127, 128}$ 1871
    Ba^{131} 7079
    Ba^{133} 11·7 keV excited state, upper limit 4983
    Be^7 disintegration constant in Be, BeO, BeF$_2$ 5002
    Bi 2653
    Bi^{210} 4982
    Bi^{212}, mag. dipole γ-ray trans. 3548
    Br^{77} 8653
    Br^{82} 5674
    C^{11} 4343
    Ca^{39} 2708
    Ca^{40}, X-ray irradiated 6228
    Ca^{45} 3545
      redetermination 7065
    Ca^{47} 6232
    Cd^{117} 4318
    Ce, short-lived isotopes from U fission 4370
    Cf^{246}, spontaneous fission rate 3547
    Cl^{32} 5672
    Cm^{242}. fission 7082
    Co^{54} 7068
    Co^{60} 4982, 7066
    Co^{60m}, automatic recording electroscope method 7062
    Cr^{49} 7075
    Cr^{51} 396
    Cr^{55} 2654
    Cs^{128} 1871
    Cs$^{133, 135}$, mag. dipole γ-ray trans. 3548
    Cs^{134} 4995
    Cs^{137} 3608
    Cu^{66} 2651
    Cu^{68} 7064
    Dy^{157} (limit) 5679
    Eu^{150} 7875
    Eu$^{152, 154}$ 395, 2649, 4982

Radioactivity—*contd.*
  decay periods—*contd.*
    Ga$^{64, 65}$ 7073
    Gd^{150} 7875
    Ge^{73} excited state 7072
    Ge^{75m} 398
    Ge^{78} 2658
    He^6 1922, 2662
    Hf^{181} 4879
    Hg^{198}, γ half-life 7113
    I^{131} 4982, 4986, 5091
    I^{134} 5088
    In$^{110, 112}$ 4996
    In^{116} 4982
    K^{40} 8650
    Kr^{83} 3542
    Kr^{85}, mass spectrometer det. 4984
    Li^8, meas. method 4978
    Mg^{27} 2651, 4982
    Mg^{28} 3554, 4302, 4997, 5022, 7876, 8651
    Mn^{50} 7068
    Mn^{56} 4982
    Mn^{56} 5086
    Mo^{90} 4301
    Mo^{93} 1060
    Na^{24} 4982
    Nb^{95} 5000
    Nb^{97} 3549
    Os^{185} 4995
    Os$^{186m, 187m}$ 7870
    Os$^{191, 193}$ 1055, 4995
    P^{28} 5672
    P^{30} 3543*
    P^{32} 4982
    P^{33} 1132
    Pb^{207} 2662
    Pd^{109} 5005
    Pm^{147}, mag. dipole γ-ray trans. 3548
    Pu^{241} β^- $\frac{1}{2}$-life 5673
    Pu^{243} 4305
    Rb^{83} 1057
    Rb^{84m} 2659
    Rb^{87} 1058, 1867
    Re^{188m} 6198
    Rh, neutron-deficient isotope 3584
    Se^{79m} 7938
    Si^{27} 2708
    Si^{31} 1052, 3542
    Si^{32} 7876
    Sm^{151} 395
    Sn^{124}, double β-decay 5014
    Sr$^{81, 82, 83}$ 1057
    Ta^{181m}, 16 μsec. by bremsstrahlung capture 5693
    Tb^{157} (limits) 5679
    Tc stability study 7864
    Tc^{99m}, influence of chem. state 4985
    Te$^{123, 125}$, mag. dipole γ-ray trans. 3548
    Te^{130} 5019
    Te^{131} 2652
    ThB 6194
    ThC′ 1865
    Ti^{46} 4998
    Ti^{51} 2651, 4992
    Tl^{204} 4982
    Tl^{206} 2651
    Tl^{208}, mag. dipole γ-ray trans. 3548
    Tm^{170} 7067
    U$^{234-6}$ 1059
    V^{46} 7068
    V^{52} 2651
      metastable state 8652
    W^{187} 3546
    Xe$^{121, 122, 123}$ 1061
    Xe^{135} 5089
    Zn^{62} 4343
    Zn^{64} 7089
    Zr^{95} 5000
    Zr^{96}, double β-decay 5014
    Zr^{97} 3549
  decay schemes
    spontaneous fission *v.* α-decay 1864*
    experimental techniques (book) 2633
    time-free solns. method 2647

adioactivity—*contd.*
  decay schemes—*contd.*
    short-lived isomers search 4307
    use of coincidence methods, review 5024
    ang. correl. theory for cascade 5678
    double β-decay, favourable region 5683
      search for, Sn^{124}, Zr^{96} 5014, 6207
      ditto, Te^{130}, Se^{82} 5019
    nuclei with 2 or 3 level pairs, integral relations 7035
    Ac^{227} 5691
    AcK α-branching 4308
    Ag^{106} (24-min) 6201
    Ag^{110} 1053
    Ag^{112} 7071
    Al^{25,27} 2672
    As^{71} 7087
    As^{73} 7072
    As^{77} 8653
    Au, neutron-excess isotopes 1868
    Au^{197m} 7080
    Au^{198} 4988
    B^{12} 2662
    Ba^{127,128} 1871
    Br^{77} 8653
    Br^{80} 7137
    Br^{82} 5674
    Ce^{143} 1076
    Cr^{49} 7075
    Cr^{51} 396
    Cr^{52} 8652*
    Cs^{128} 1871
    Cs^{134} 4995
    Cu^{67} 7877
    F^{20} 5015
      β-decay 1897
    Fe^{59} 1870
    Ga^{64} 7073, 7078
    Ga^{65} 5004, 7073
    Ga^{67} 5003
    Ge^{78}–As^{78}, fission chain 2658
    Hf^{181} 4879
    I^{126} 4989
    I^{131} 1053
      review 1056
    In^{110,112} isomerism 4996
    In^{114} 397, 2491
    Ir^{192} 5684
    K^{40} 410, 1866
    Li^{8} 2662
    Lu^{176}, natural 5677
    Mg^{26} 4324
    Mg^{28}, 4997, 5676, 8651
    Mo^{90} 4301
    Mo^{93m} 7074
    MsTh$_2$ 7090
    Nb^{95} 2657, 3552, 5000
    Np^{240} 7874
    Os^{185,191,193} 4995
    Os^{191} 1055, 4995
    P^{32}, genuine coincidences 5021
    Pd^{112} 7071
    Po^{210} α-disintegration 1875
    Po^{214}, comparison of 2 schemes 8663
    Pt^{191,193m} 4306
    Pu^{239,240} 1063
    Pu^{243} 4305
    RaC 4987, 6196
    RaD 2655, 7085, 7872
    RaE, genuine coincidences 5021
    Rb chain, 25·5 day—76 sec 4993
    Rb^{82,83} 1057
    Rb^{82,84} 1880
    Rb^{84m} 2659
    Rb^{87} 1058, 1867
    Re^{187} 4304
    Re^{188} 7870
    Rh^{104} (44 sec), Rh^{104m} (4·3 min) 6199
    Rh^{106} 404, 5675
    S^{35}, genuine coincidences 5021
    Sb^{124} 1053, 7081
    Sc^{43} 1075
    Sc^{46} 7069
      γ-ray cascade following decay 4998

Radioactivity—*contd.*
  decay schemes—*contd.*
    Sc^{47} 6200
    Sc^{48}, data for Ti^{48} levels 7866
    Se^{75} 4999
    Se^{82}, double β-decay 5019
    Si^{28} 2672
    Sn^{124}, double β-decay search 5014
    Sr^{81,82,83} 1057
    Sr^{91} 7077
    Te^{130}, double β-decay 5019
    Te^{131} 2652
    Ti^{51} 4992
    Tl^{204} 1069
    Tm^{170} 7067
      β–γ ang. correl. 1884
    U^{237} 2656, 3551
    U^{240} 7874
    UX$_1$ and UX$_2$ 7088
    UY 1881
    V^{48} 1869
      data for Ti^{48} levels 7866
    V^{52}, metastable state 8652*
    W^{187} 4304
    Y^{91} 4991
    Y^{91m} 7077
    Zn^{65} 4990
      K/β^+ branching ratio 406
    Zn^{67}, from Cu^{67} decay data 7865
    Zn^{69} 2661
    Zr^{95} 2657, 3552, 5000
    Zr^{96}, double β-decay search 5014
    Zr^{97} β-decay 3549
  electron capture
    K/L capture ratio meas. 405
    nuclei, radioactive props. rel. to chem. struct. 1863
    resonance, from H by fast protons 1904
    internal bremsstrahlung emitted in *K* capture 2665
    atomic excitation and ionization accompanying 3559
    Sargent diagram for *K*-electron capture 5013
    atomic electron effects 5017
    A^{37}, *K*-capture, inner bremsstrahlung 5001
    Au^{198}, *K* Auger intensities 2677
    As^{70}, K/β^+ 3550
    As^{73} 7072
    Ba^{128,129} 1871, 7869
    Ba^{131} 7079
    Cd^{107}, K/β^+ ratio 5016
    Co^{58}, K/β^+ ratio 5016
    Cr^{51} 396
    Cs^{128} 1871, 7869
    Cs^{134} 4995
    Cs^{137}, *K* Auger intensities 2677
    Cu^{61,64} K/β^+ ratio 5016
    Fe^{55}, *K*-capt., atomic orbital electron ejection 3556
      X-radn. and continuous γ-radn. 5692
      double ionization 8659
    Ga^{67} 5003
    In^{110,112} 4996
    In^{114}, *K*-capt. 2491
    K^{40}, branching ratio 410
      K-capt. γ-emission assoc. 1866
    Kr^{79} L/K capture ratio 407
    Na^{22}, K/β^+ ratio 5016
    Nd^{147} 90 keV line, K/L ratio 421
    Ni^{57}, K/β^+ ratio 5016
    Os^{185,191,193} 4995
    Pt^{191} 4306
    RaD *K* and *L* X-rays 4326
    Rb^{86,86m} 7873
    Sb^{124} 7081
    Se^{75} 4999
    Sn^{111}, K/β^+ ratio 5016
    Sn^{113}, *K* Auger intensities 2677
    Sr^{82} 1057
    Tl^{204} 1069
    V^{48}, K/β^+ ratio 5016
    Zn^{64}, no double *K*-capture 7089
    Zn^{65} 7871
      K/β^+ ratio, 406, 5016, 5018
  protection see *Radiation protection*

- **Radioactivity measurement** see also *Dosimetry; Radiation monitoring* and the specific radiation, e.g. *Gamma rays*
  - Th series radiometric properties 393
  - *K*/*L* capture ratio 405
  - airborne, precipitated in rain or snow, in nuclear explosions tracing 569
  - radiocarbon dating, automatic counter appl. 926
    - Lamont measurements 1046
    - proportional counter use 1048
    - book 1276
    - sample prep. and counting tech. 2646, 3538
    - review 2839
    - new technique 3764
    - as CO_2, in gas counters 6878
  - I^{131}, counting methods compared 1044
    - British standard 1045
  - assay methods, Pb/U ratio in U minerals by RaD method 1047
    - pegmatite U content, nuclr. emulsion method 2641
    - mixed radioisotopes 2644
    - Ta ores 2645
    - U and Th in ores by simult. β- and γ-activities meas. 5187
  - natural radioactivity background meas. 1049
    - fluctuations influence 8647
  - β/γ ratio, meas. in roentgen units 1072
  - β-active particles identification, autoradiog. method 1078
  - minerals, combined electron-reflection and autoradiography 1859, 6192, 8163
  - experimental techniques (book) 2633
  - radon, micro-curie amounts, scint. counting method 2639
    - small quantities, counting method 5668
    - in atm., from products in dust samples 8648
  - isotopes standardization by coincidence and γ-ray ionization 3540
  - radioactive aerosols, collection by precipitation 3640, 7856
  - activity distrib. meas., radiography 4538
  - Ac quant. est., photographic 4975
  - radioactive isotopes (book) 5051
  - course in radioactive determinations 5052
  - spec. activity of radioactive solutions 5669, 6348
  - radio-iron dosage, electrolytic method 5751
  - det. of traces of Io in deep-sea sediment 5795
  - β-ray effect on α-particle counting 6881
  - short-lived radioactivities, delayed coincidences study 7063
  - neutrons from Cm^{242} 7082
  - directional correl., finite ang. resolution correction 7858
  - **apparatus** see also *Cloud chambers; Counters; Ionization chambers; Particle track photography*
    - survey meters, pocket dosimeters, etc., X-ray calibration 2640
    - counters for aerial ground contamination surveying 2642
    - C^{14} gas counting methods, equip. 2646
      - in proportional counters containing $C^{14}O_2$ 285
      - quench circuit 6878
    - correction for filter-paper absorpt. of α-particles 2664
    - high-energy particles, fast coincidence system 4164
    - recent developments, England 4875
    - Cherenkov detectors 4882
    - abs. calibration, 4π counter, high-energy β-emitters 4973
      - low-energy β-emitters 4974
    - geological applications 5796–7
    - wide-range instr. using NaI cryst. and photomultiplier 6191
    - scintillation unit for drill-hole logging 6891
    - automatic recording electroscope in half-life det. 7062
    - pulse interval analyser, short-lived radioactivities appl. 7063
    - short periods, pneumatic extractor, oscilloscope presentation 7068
    - recorder, for aerosols 7742
    - filter for air meas. 8646
- **Radio-astronomy** see *Cosmic radiations, r.f.; Sun, radiation, r.f.*
- **Radiochemistry** see also *Chemical analysis, radioactive Chemical effects of radiations; Radioactive tracer*
  - separation techniques, Fe^{59} production 427
    - Na^{22} from Mg, ion-exchange method 498
    - Si^{31} from irradiated P 1052
    - RaD chemical separation 1499
    - S^{35} isolation 1901
    - book 2633
    - in Fe^{59} prod. by $Co^{59}(n, p)$ 3603
    - Br^{82} preparation, Szilard–Chalmers reaction 567
    - P^{32} from pile product 7116
    - As^{76} from $(CH_3)_2AsOOH$, Szilard–Chalmers 790
    - Zn^{65} source, high spec. activity, prep. 7906
    - As^{79} and Se^{79m}, from U^{235} 7938
  - CH_4 reactions with *n*-activated I 515
  - π^- meson activation of Br 1224
  - Th^{232} fission, Li + D neutrons, study 2728
  - Re 18-min nuclear isomer mass assignment 3572
  - radioactive Co laboratory 4298
  - photofission yield studies, U 4357
    - Th 5076
  - neutrons on ZnS phosphors, Cl microdosage appl 8030
- **Radiography**
  - metallurgical (book) 482
  - doses during diagnostic procedures 573
  - fluoroscopic images intensification 1319
  - combined electron-reflection and auto- 1859, 6192 8163
  - autoradiography, melted emulsion tech., improvements 2125
  - γ-radiography techniques, appl. 2127
  - autoradiography of metal surfaces, radiochem method 2128
  - neutron autoradiographic tech. for B in B steel 2129
  - faulty technique, detect. by direct meas. 2867
  - α-track autoradiographs, biol. specimens 2875
  - high voltage, modern techniques 2876
  - grid X-ray stereoscope 2877
  - wear fragments looseness, autoradiographic stud 4434
  - of human body with radioact. isotopes 4538–9
  - clinical, image magnification 4546
  - indirect autoradiog. with scint. counter 4547
  - use of Be-window low-voltage tubes 5511
  - **accessories** see also *Fluorescent screens; X-ray tubes*
    - low-energy γ-ray sources 4319
    - integrating exposure meter 6350
    - EM-4 electronograph as micro-source 8444
  - **microradiography**
    - metallurgical, fluorescence X-rays appl. 2126
    - X-ray shadow microscopy 2130
    - X-ray microanalyser camera 5186
    - micro-beam tech. for plant cells 5510
    - use of Be-window low-voltage tubes 5511
    - automicroradiograph tech., collodion emulsion appl 6363
    - improved historadiographic appl. 7368
- **Radiometer gauges** see *Vacuum gauges*
- **Radiotherapy** see also *Biological effects; Dosimetry*
  - Zurich betatron for cancer therapy 889
  - deep-seated cancer, $Eu^{152, 154}$ appl. 2649
  - 23 MeV X-rays, skin effects 2861
  - dose computing device, for high energies 2869
    - supervoltage, rotational, for tissue 4537
  - midget X-ray tube 3344
  - travelling-wave linear accelerator 4135
  - teletherapy units, sources, shaped 4536
    - multicurie γ-ray 7117
  - radioactive solns., spec. activity meas. 5669
  - radioactive subst., β dosage det. 6348
- **Radio-wave propagation** see *Electromagnetic wave propagation*
- **Radio-wave spectra** see *Spectra, radiowave*
- **Radium**
  - vertical distrib. in deep-sea sediments 5794
- **Radon**
  - counting methods for radioactivity meas., smal amounts 2639, 5668
  - absorpt. in nuclear emulsions 8165
  - airborne products, meas. 8648

Rain
- formation by cloud drops coalescence 566–7, 4503–4
- radar location techniques 1287
  - natural rain observations 1288
  - measurements (conf. rep.) 2094
  - frontal precipitation 2848
  - bands in vertical struct. 2849
  - upper band, rel. to graupel layer growth 4502
  - precipitation growth, clouds 4503
  - rain from non-freezing clouds 4505
  - at Sydney, N.S.W. 6330
  - conference report 6973
- microwave attenuation 1301
  - and scattering 2571
  - scattering by melting ice particles 5809
- artificial precipitation, review 2850
- drops, evap. while falling 4506
- T activity studies 5805
- charged droplet development, effect on precipitation 7365

Rainfall see also *Condensation; Snow*
- areal, radar meas. 5806
- possible influence of moon 5807

Raman spectra see also *Luminescence spectra*
- photoelectric apparatus 111
  - recording, in polarized light 7593
- self-recording apparatus 151, 5412
- source unit for Raman spectroscopy 791
- industrial spectroscopy colloquium 1488
- irradiation app. for gases 4730
- intensities, bond polarizability theory 4731
- polarization, and freq. var. anomalies 5409
  - data, statist. interpret. 6559
- 25 years retrospect 5411
- of powdered crystals 6661
- rel. speeds of Raman spectrometers 7554
- in solids, review 8336
- rel. to atomic arrangement in cryst., review 8769
- **inorganic substances**
  - rare earth nitrates, aq. solns. 153
  - liquid NO 740
  - CF_3Br and CF_3I 755
  - CF_3OF 756
  - carborundum 775
  - liq. and solid O, O_4 anomaly 1517
  - HNO_3 and aq. solns. 1550
  - BrF_5 1551
  - O_2, N_2, Cl_2, CO_2, CS_2, modified Silberstein optical anisotropy model appl. 1820
  - SiH_2Cl_2 2343
  - $BaCl_2.2H_2O$ 2374
  - $AlCl_3.6H_2O$ monocrystal 3167
  - CCl_4, effect of e.s. field 4032
  - $N_2O_4.3SO_3$ and $N_2O_5.3SO_3$ 4033
  - $NaCl.AlCl_3$, $NOCl.AlCl_3$ 4727
  - $GaCl_3$ solid and liquid 4728
  - $ZnSO_4.7H_2O$, SO_4 ion internal oscillations 4729
  - zinc blende 4733
    - ionic network macroscopic theory appl. 4734
  - calcite, polarization anomalies 6662
  - water in hydrated crystals 6663
    - in gypsum, band widening with temp. increase 7595
    - in $HgCl_4K_2.H_2O$ 7597
  - NH_3 ν_3 band 6664
  - $AlPO_4$ 7596
- **organic substances**
  - light and heavy trifluoroacetic acids 138
  - line width in paraffin hydrocarbons 774
  - para-dihalogen-benzene, molec. crystals, selection rules 1005
  - decaborane in CS_2 soln. 1009
  - chloroacetyl chloride, bromoacetyl chloride and bromide 1016
  - dimethyldiacetylene 1525
  - hexafluoropropene 1532
  - *p*-diphenylbenzene in various solutions 1552
  - $CHClBr_2$ and $CDClBr_2$ 1804
  - oxalyl chloride 2340
  - dicyanoacetylene 2352
  - acetic acid aq. soln. 2375
  - *cis*- and *trans*-dichloroethylene-*d* 3119
  - dibromodifluoromethane 3120
  - CF_3CF_3, CF_3CF_2Cl, CF_3CFCl_2, CF_3CCl_3 3142

Raman spectra—*contd.*
- **organic substances**—*contd.*
  - *p*-benzoquinone 3164
  - cinnamyl chloride, intensity var. with substitutions 3165
  - di-halogen substituted benzene 3166
  - benzoyl chloride in benzene 3168
  - vinyl- and dichlorovinyltrichlorosilane 3169
  - thianthrene, molten 4034
  - intensity rel. to chem. structure 4732
  - organic mixed crystals 5407
  - parachlorphenol, parabromphenol and mixtures 5408
  - gaseous ethylene 5410
  - CF_3CH_3, CF_3CH_2Cl, CF_3CHCl_2, CF_3CCl_3 5961
  - CCl_3CF_2Cl, CCl_3CFCl_2 5962
  - monomeric methyl methacrylate, −180°c 5973
  - hexamethyldisilane and hexamethyldisiloxane 5974
  - Cl–Br mixt. in CCl_4 5975
  - acetone/*n*-hexane mixtures, line shift rel. to heat of mixing 6017
  - pyridine and pyridine-d_5 6621
  - low pressure vapours, e.g. CH_4, CH_3Cl 6660
  - powdered naphthalene crystals 6661
  - chloroacetone, rotational isomerism data 7258
  - CCl_4 7593
  - alkenyl silanes 7594
  - thianthrene in various solutions 7598
  - resinic acids and derivs. 7599
  - rotational, of benzene vapour 7600
  - thianthrene in soln. 8335
  - gaseous ethforane 8337

Random functions
- entropy concept rel. 636
- in physical measurements, review 8199

Random processes see also *Brownian movement; Fluctuations; Statistical analysis*
- stochastic processes depending on a continuous parameter 4556

Range of particles see also *Scattering, particles;* and under individual particles, e.g. *Protons*
- range straggling eval., heavy particles 274
- ionization loss, various matls., density effect 932
- fission fragments, energy loss 1927–8
  - and particles from cosmic rays 5529
- in emulsions, α-particles and deuterons 2882
  - α-particles and protons 3370
  - $Li^{6 \text{ and } 7}$ 5072
  - pos. ions 5530
  - general calc. 6869
  - Be^9, B^{10}, C^{12} 7142
- pos. particles, extension by electron pick-up 3371
- mean excitation potentials study 4153
- heavy ions in gases 6099
  - H, He, N and Ne ions in gases 6868
- stopping power of some elements 6860
- fast particle in dielectric 6896

Rare earths
- paramag. res. abs. of salts, theory 6950, 7797, 8385, 8562

Reaction kinetics see also *Catalysis; Chemical reactions; Exchanges, chemical; Explosions; Reaction rates*
- induction period in chain reactions 499
- butadiene dimerization and vinylcyclohexene dissociation 500
- rel. to relaxation time of equilib. systems 506
- NO decomposition, reaction products effect 1212
  - theory 5156–7
- acetylene/O, gas phase 3675
- isotopic exchange between I ion and organic iodides 3677
- *cyclo*propane slow combustion 3680
- collision processes, role 3681
- chain reactions with two diffusing active centres 3682
- benzaldehyde oxidation in soln. 3684
- benzaldehyde uncatalysed oxidation in soln. 3685
- hydroferrocyanic ion dissoc. in soln. 3686
- 2 exchange reactions involving diborane 4444
- H_2S thermal decomposition 4447
- acrylonitrile polymerization 4457
- liq. acetaldehyde photo-oxidation 5743
- long-delay flames, cyanogen-air 5745
- methaemoglobin azide formation 6284
- NH_3 and O in quartz vessel 7234

Reaction kinetics—*contd.*
- molecular, of hydrogenation and ethylene exchange reactions 7235
- gases, fast-scanning mass spectroscope study 8009
- equilibrium constant, *K*, in soln. 8010
- meas., recording differential manometer 8251
- gas-phase studies, fast-scanning i.r. spectrom. appl. 8731

Reaction rates see also *Reaction kinetics*
- equilibrium and the rate laws 505
- Ni/C alloys with BaO 1174
- rate laws and oxyanion reactions with bases 1201
- K azide thermal decomp., exciton mech. 2001
- H–O, NOCl sensitizer 2006
- Cu oxidation, moderate temp., press. effect 2007
- acceleration in soln. by elec. field 2431–2
- PbO inhibiting effect, methane slow oxidation 2800
- methyl radicals combination rate 4442, 8008
- quantum-mech. calculations 4443
- influence of temp. and press. 5151
- gaseous, unimolec., press. and vibr. degeneracy effects 5155
- powder reactions in silicates, radioact. indicators appl. 5158
- accelerated at thermal trans. points, solids 5203
- ethyl acetate hydrolysis, effect of sound 5746
- rate constants for specific activated states 6281
- Hg complexes, formation, det. by conductivity meas. 6283
- N_2O decomp., effect of electronic disorder in oxidic catalysts 6285
- thermodynamics, isotopic substitution effect 8004
- rate const. for H_2O_2 and ferrous ions reaction 8730
- $NO–N_2O_5$, rate constants 8732
- $NO_2–CH_2O_5H$ 8733

Recombination see *Ions, recombination*

Recording see also *Sound recording*
- logarithmic counting-rate recorder 16
- instruments with inkless recording 593
- h.f. cinematograph images 2134
- photographic, Fourier integral appl. to images 2871
- semi-automatic, of wavelength data 7413
- rel. to measurement, classification of apparatus 7477
- photoelec., of Raman spectra in polarized light 7593
- small vol. changes, elec. method 8248
- photographic, of N.P.L. interferometer length measurements 8344

Rectifiers
- Se, relaxation phenomena 228
  - contact p.d. 852
  - temperature variation 4094
  - capacitance 4809
  - barrier mechanism 6783
  - d.c. charac., theory 8423
- *p-n* junctions, by growth rate var. 229
  - current flow temp. dependence 230
  - Ge, high-field current-voltage charac. 534
  - α-values interpret. 2452
  - pressure-welded, Ge 4097
  - "fused impurity," impurity diffusion and space charge layers 6049
  - revealed by electrolytic etching 8404, 8416
  - post-injection barrier e.m.f. 8422
- Si, props. important in electronic devices 851
  - thermal treatment effect 2431
  - crystal growth from Ga and In solns. 4646
- crystal, temp. effect and neg. resist. 850
- 3-electrode transistor, barrier layers and fluctuations interact. 853
- transistor electronics, review 854
- crystal detectors, fluctuations effect 855
- intermetallic compds. (Cd–Sb), props. 1638
- TiO_2 film on Ti 2453
- filamentary transistors, large amplifications 2454*
- PbTe transistor action 2456
- electrolytic, Al_2O_3 film 3305
- potl. barrier height, barrier layer cells 3307
- PbS, transistor action and related phenomena 4098
- solid, theory 6048
- Ge, theory 6051
  - *p-n* junctions by growth rate var. 229
  - *p-n*, current flow temp. dependence 230
  - *n-p*, junction high-field current-voltage charac. 534

Rectifiers—*contd.*
- Ge—*contd.*
  - props. important in electronic devices 851
  - neg. resist., freq. charac. 856
  - single-crystal, growth and props. 858
  - high inverse voltage, reverse charac. 2455
  - current/voltage charac. theory 3308
  - thermally treated 3309
  - elec. forming., thermoelec. study 3310
  - Hall effect appl. 3470
  - phototransistors, props. 4096
  - *p-n* junctions, pressure-welded 4097
  - shot noise in filaments 4099
  - crystal growth from Ga and In solutions 4646
  - contact p.d. changes during forming 6050*
  - diodes, thermal props. 7673
  - transit time effect on behaviour 8421
- different potl. electrodes, same metal, tunnel effect 6784
- dry, static theory application limits 6785
- polarized $BaTiO_3$, rectifying prop. 7653
- semiconductor circuit elements, review 8413
- point-contact transistors, mech. 8416
- contact noise temp. dependence 8417
- diffusion theory of barriers mobility variation effect 8418
- tunnel effect and thermal excitation, comparison 8419
- flicker effect theory 8420

Reflecting microscopes see *Microscopes, reflecting*

Reflection see also *Neutrons, reflection; X-ray reflection*
- total, point source, surface waves 5926
- from various media, theory 7805
- **acoustic waves** see also *Echo; Reverberation*
  - transient pulse by parabolic cylinder 684
  - elastic waves at free surfaces, critical 685–6
  - elastic waves in solid media 687
  - spherical pulse by absorbent plane 1463
  - oblique incidence, particle motion at surface 3030
  - critical, at free surfaces 3954
  - standing, photographic invest. of concave mirror field 4669
  - in ocean, from temp. changes 6567
  - **ultrasonic**
    - from hollow cylinder in elastic body 688
    - from ceilings, u.s. meas. 4674
- **electromagnetic waves**
  - ionospheric measurements, oblique incidence 562
    - limiting polarization 1791
    - review 2574
    - 33 Mc/s, back-scatter 2855
    - random fading charac. 3460
    - 150 kc/s, long-delay echoes 4234
    - from ionized layer, vertical and horizontal gradients 4935
    - from ionosphere irregularities 8811
  - seawater refl. coeff. 833
  - transient, by dipole, acoust. wave analogy 1463
  - microwave, by Hg vapour discharge 1774
  - obliquely from inhomogeneous medium 1777
  - by rough surface, theory 2564
    - coeffs. for certain surfaces 6153
  - tropospheric, with varying index profile 2572
  - 33 Mc/s, from aurora 2855
  - radio, from meteor trails 3802
    - 33 Mc/s, long duration 2855
    - from frozen terrains 3459
    - decay 4560
  - Schmidt camera for radio waves 4928
  - microwave calorimeter theory 4936
  - microwaves, by detonation phenomena 5153
  - cm waves, ground and water 5591
  - from atm., effect of refract. index gradients 5593
- **light** see also *Mirrors; Optical films*
  - textbook 98
  - total, of spherical waves, ray displacement theory 103
    - lateral displacement 7541
  - reflectance curves prediction from dye formulations 169
  - reflecting power, vac. u.v., meas. app. 777
  - reflectometers using photometric sphere, errors 1480
  - multilayer film, matrix eq. 2381
    - 4000 to 4600 Å 4738
  - reflectance correction in scattering studies 3186

A complete list of the Subject Headings will be found at the end of the Index.

Reflection—*contd.*
  light—*contd.*
    reflecting surface shape study 3965
    from thin films, phase shift 4039
      Al, phase and intensity measurements 4718
      Al, effect of vapour incidence 5126
      TiO_2, as near i.r. selective reflector 5977
    new treatment of physical processes 5373
    uniaxial crystal optical parameters det. 5380
    silica lens containing Hg vapour, reflect. factor 5416
    from ice crystals in sky 5811
    geometrical laws, from diffraction asymptotic formulae 5939
    amorphous and hexagonal Se 5966
    retro-reflecting matls. photometric testing methods 6584
    thin absorbing layers refract. index meas. 6668
    3 plane-mirrors, parallel reflection 7542
    natural and synthetic hackmanite 7548
    multiple internal, effect on half-tone print density 8156
      in photog. colour print 8173
Reflectivity see also *Optical films*
    photometric meas., Schumann u.v. 778
    diffuse, crystall. powders, absorpt. det. appl. 1536
      by fluorescent powders, u.v. absorpt. meas. appl. 1537
      MgO, near i.r., rel. to wavelength and time 2362
    metals and anomalous skin effect 1556, 6787–8
    metals, i.r., electron theory 1557
    optical constants det. from reflectivities 2316, 3092, 8395
    thin film, simultaneous det. with thickness 3177
    lamellar, for multiple reflections 4037
    stratified medium, var. calc. appl. 4038
    the Lorentz transformation 4587
    films, Au, Pt, Cr, in Schumann region 4737
      Rh, Be, Ni, in Schumann region 7605
      very thin metallic, calc. 8343
    directional, snow 7603
    spectral, of thermopile, meas. 7638
Refraction see also *Neutrons, refraction*
  acoustic waves see also *Dispersion, acoustic*
    at small circular opening 8294
    ultrasonic
    high intensity, effectiveness of plastic lenses 689
  electromagnetic waves see also *Electromagnetic wave propagation*
    troposphere, factors controlling 1289
      fluctuations, profile 1302, 2856, 5257
      gradient, geog. and height distrib. 5256
    rapidly varying index, solution 1786
    atmosphere, revision of constants 8593
  light see also *Double refraction*
    textbook 98
    in lenses, Maxwell's eq. appl. 724
    Au and Ag films, u.v. 2318
    crystals, dispersion formulae 3973
    toric wavefronts 5938
Refractive index see also *Dispersion, optical; Double refraction*
    Te single crystals, i.r. 145
    vapours of benzene, CCl_4, cyclohexane, methyl acetate, methyl alcohol 726
    atmosphere, radiowaves, factors affecting 1289
      fluctuations 1302
      fluctuation and profile record 2856, 5257
      equation constants 8593
    inhomog. absorbing media, wave eq. 2310*
    KBr, for i.r. radiant energy 2317
      visible wavelengths 3091
    magnesium oxide, $0 \cdot 36–5 \cdot 35\ \mu$ 3090
    PbS, PbSe, PbTe, $0 \cdot 5–3\ \mu$ 3093
    PbTe and Si, inter-relation 3094
    water vapour, air, O, N, H, D, He, 9200 Mc/s 3455
    evap. film, effect on reflection phase shift 4039
    liquid UF_6, 65°–100° 4634
    a 980 : 222 glass 5940
    glycerine, discontinuity at change of state 6597
    Se, amorphous, 5 to 15 μ 7547
      liquid, near i.r. 106
    natural and synthetic hackmanite 7548
Refractive index—*contd.*
    semiconducting film, effect of light 8308
    Al_2O_3, thin films 8309
    Pb titanate 8761
Refractive index measurement
    metals, dispersion, new photog. method 157
    small differences, interf. fringe method 1487
    reflection methods, coeff. ratios 2316
      improved method using coeffs. 3092
      uniaxial crystals 5380
      thin absorbing layers, phase change 6668
    liq., small differences, phase contrast appl. 3222
    plane parallel plates, interference method 4691
    textile fibres, conf. rep. 5127
    anisotropic crystals, nomogram 6595
    transparent film, by transmission factor meas. 6596
    atmospheric, r.f., eq. constants 8593
Refractometers
    prism, graphical method appl. 1482
    interf. fringe, for small differences 1487
    recording, for liquid streams 2315
    microwave, tropospheric fluct. recording 2856
      for atm. refract. index var. 2858
    highly sensitive, differential 3089
    precision, without circular scale 3970
    Jamin, fiduciary fringes 3971
    phase-contrast, for gases and liq. 3972
Refrigerators see also *Low temperature production*
Relativity
    eq. of fit for spherical distrib. 18
    necessity for indeterminacy 596
    relativistic theory of a rigid body 1357
    space, field and ether, review 1358
    relativistically rigid rod 1361
    action as co-ordinate of space 1362, 2925
    velocity as qualitative magnitude 1363–4
    modified Newtonian systems 1365
    interference phenomenon, interpretation 1476
    matter concentrations and Schwarzschild singularity 2168
    of size, similarity principle for physics eq. 2169
    similarity theory, rel. to Dirac–Schrödinger electron theory 2170, 7420
    relativistic electrodynamics of magnets 2554
    phys. and geom. quantities, world tensor repres. 2930
    field of charged point-mass 2940
    ether, existence, historical survey 3847
    conformal theory 3848, 7414
    one-dimensional rocket motion theory 3891
    spinor theory 7415
    spatial rotation assoc. with Lorentz cycle 7417
    binary stars and light vel., Riemannian space appl. 7419
    thermodynamics of relativistic fluid 7422
  general see also *Cosmology; Gravitation*
    integration of the cosmological equations 19
    role of solid connections 20
    relativistic e.m. equations, simplified form 22
    point mass gravitational field, Birkhoff's theory 594
    Birkhoff's gravitation theory eq. of motion 595
    treatment of clock problem 1360
    spin and angular momentum 2167
    and unified field theory, review 2172
    quasi-relativistic theory of gravitation 2174
    field theory covariance, rel. to eq. of motion 2182
    eq. with e.s. field, certain exact solns. 2927
    "Newtonian" time 2928
    e.m. equations in material medium 2929
    precession of asteroid Icarus 2931
    radiation sphere in Einstein universe 3079
    spherically symmetrical gravitational fields, boundary conditions 3849
    expanding universe, radn. apparent disappearance 3850
    short-range forces theory 3851
    Birkhoff's theorem, invalidity in gravitation extended theory 4583
    gravitational waves, auxiliary conditions 4584
      and gas motion on hypersurface 5287
    conservation laws of energy and momentum, formulation 5845
    gravitation theory, field eq. deriv. 5846

A complete list of the Subject Headings will be found at the end of the Index.

Relativity—*contd.*
  general—*contd.*
    possibility of new static cosmological model 5848, 8207
    mass-energy rel., Einstein's 1905 deriv. 6445
    gravitational motion, review 7421
    generalized Riemann spaces and general theory 8175
    pure radiation fields with central symmetry 8204
    a rotationally symmetric solution 8206
    thermodynamics in 8208
  kinematical
    conformal transformations appl. 4585
    Lorentz transformations not forming "group" 7418
    in cosmology, review 8183
  special
    impulse and mass in relativistic mechanics 21
    new kinematical considerations 597
    space-time concept, review 2163
    Lorentz transformation physical interpret. 2173
    rotating cylinders, relativistic deformations 2933
    generalized e.m. theory with double gauge invariance 2934
    continuum description 5847
    10 general integrals of eq. of motion 8205
  unified field theories
    Einstein and Schrödinger, approx. solutions 17
    eq. of e.m. field in Einstein's theory 1356
    modification, physical implications 1359
    Schwarzschild's problem generalization 2164
    Einstein's theory discussed 2165–6
    with varying charge and rest-mass 2171
    affine generalizations 2172
    e.m. eq. from principle of least action 2175
    Schrödinger final affine laws 2926
    and Born–Infeld electrodynamics 2932
    Bopp's theory, mass var. with velocity 2948
    new eq. in affine field laws 3858
    Einstein's theory, divergence identities 6444
    e.m. and gravitational field, 5-dim. theory 6446
    electrodynamic eq., 6-dim. generalization 6447–8
    spinor theory 7415
    5-dimensional, eq. of motion and field eq. 7416
    spinor connection in unified Einstein theory 8202
    connections between Einstein's two unified theories 8203
    gravitation and electromagnetism 8209
Relaxation see also *Acoustic wave propagation; Dielectrics; Differential equations, relaxation methods; Elastic relaxation; Magnetic relaxation; Molecules, relaxation*
  in Se rectifier 228
  acoustic, in van der Waals gas 682
    time, equilib. system, rel. to u.s. absorpt. and reaction kinetics 506
    u.s., in solutions, and ionic relaxation 683*
    u.s., in glycerol, rel. to dielectric relaxation 1456
    u.s. absorpt., frictional relax. mech. 3947
  uniform theory contrib. 1985
Resistance, electrical see also *Conduction; Contact resistance; Electric strength*
  mechanism of changes in mag. field 213
    Fe films 3318
    metals, low temps. 3319
    noble metal alloys, low temp. 6809
    Fe_3Pt 7689
  metal films, rel. to bulk resist. 214
    Mo, effect of protective SiO layer 1177
    Fe, mag. field influence 3318
    Te under various treatments 4084
  at low temps., minimum in Cu, Au, Ag alloys 215
    La, Ce, Pr, Nd 840
    Ni, 50–80°K 3263
    Au, v. low temp. 4105
    Cu, meas. at liq. He temp. 7665
    Gd, Dy, Eu, 2·2–360°K 8554
  changes due to radiation damage, in Cu, Ag, Au, Ni, Ta 216
    neutron irradiation, Pt 243
    β-brass, α-bombard. 3731
    Cu_3Au, ordered, electron bombard. 8452
  residual, in dilute Cu alloys 217

Resistance, electrical—*contd.*
  Ge, heat treated 223
    n-type Sb-doped single crystal 227
    and Si, review 851
    effect of plastic deformation 1190
    resistivity gradients reduction 1244
    contacts, current/voltage charac., theory 3308
    thermally treated 3309
    modulation by h.f. acoust. waves 8408
  of quenched metals 536
  thermistor, pressure influence 812
  72 elements, alloys and compds., to 100 000 kg/cm^2 837
  In–Tl solid solns., rel. to transformation 839
  graphite, artificial 842
    temperature dependence 2463
    interstitial compds. 3302
    polycrystall. graphites 4087
  Si, review 851
    and thermionic emission, 1100°c to 1350°c, conduction mech. deductions 6906
  truncated hemisphere, upper and lower limits 859
  oil film formation in gears study 1200
  temp. dependence, calc. 1644
    graphite 2463
    CdSb 3306
    Bi, low temp. increase, rel. to Hall effect 4815
    Al–Cu, Cu–Zn, temp. coeff., electron theory 7817
    dilute alloys, theory 8609
  cylinders, errors in formulae 2441
  highly permeable Ni–Fe–Mo alloy, anomalies 2442
  alloys of noble and transition metals 2443
  effect of cold working 4110
    and neutron irradiation, Pt 243
    rel. to deformation temp. 1648
    Au, Cu, change on deformation 3657
    face centred metals 4109
    and annealing, α-brass 7667
    Ni, energy release theory 8722
  constant battery Wheatstone bridge 4111
  h.f., effect of surface 4400
  insulators under ioniz. radn., method of increasing 4810
  Cu, extra-resistivity due to vacancies 6036
  Au–Cr resistance standards 6769
  fine wire in compressed air, rel. to press. 6813
  V_2O_5, near transformation temp. 6951
  v. thin metal deposit, rel. to voltage 7666
  binary alloys, short-range order influence 7816
  Te/metal thermocouples 8381–2
  Fe, liquid 8396
  TiO_2 semiconductors, ceramic and single crystal 8414
Resistance thermometers see *Thermometers, resistance*
Resistivity see *Conductivity*
Resolving power, optics see also *Optical instrument testing*
  high, of echelle spectrograph 109
  spectroscopic, rel. to Döppler effect 1494
  wire grating pair interferometer 1560
  super-resolving pupils 3182
  phase-contrast microscope 3206
  prism, effect of absorption 3966
    not at min. deviation 5376
  two spectral lines of unequal intensity 3974
  combination photog. plate and objective 4683
  photog. matls., effect of sensitization 6362
    in u.v. light 7367
  use of minimum light criterion in spectroscopy 6601
  transmission echelon, formula 6673
  multipole etalon, rel. to dispersive power 7607
  Fabry–Perot etalon 7608
  objective with 3rd-order spherical aberration 8307
Resonance spectra see *Spectra, resonance*
Resonators
  acoustic
    as absorbers in room acoustics 1474
      in broadcast studios 3960, 7536
    spherical, viscous dissipation effects 2270*
    jet-edge-resonator whistles, charac. 2281
    absorbing matl. in coeff. meas. 2296
    resonant systems in field of large amplitude waves 5908
  electromagnetic see *Electromagnetic oscillations*

A complete list of the Subject Headings will be found at the end of the Index.

Reverberation see also *Architectural acoustics; Echo*
- measurements, architectural acoustics progress 94
- meas. device for rooms and loudspeakers 96
- meas., freq.-modulated sound source appl. 97
- reverberation chamber for testing acoustic matls. 697
- meas., warble tones and white noise methods 2302
- efficiency meas. of loudspeakers 3059
- Royal Festival Hall, London 3074
- times, of sound-recording and -reproducing rooms, Berlin 4672

Rhenium
- superconductivity 240
- magnetic properties 322

Rheology see also *Plasticity*
- high asphaltene content bitumen, props. 494
- rheometer theory, Bessel function appl. 495
- plasticity conf. rep. 1192
- Weissenberg effect in blown bitumen 1197
- extrusion theory 2771
- Li soap-oil dispersions, props. 3691
- of blood, survey 4430
- of rubber, effect on plasticity tests 5142
- rigidity of elasto-viscous liquids 5145
- the rheological curve 8726

Rhodium
- Pt/Pt–Rh thermocouples behaviour, high temps. 813
- films, elec. conductivity phenomena 4797
- reflectivity in Schumann region 7605
- Rh_3Ge_2 as superconductor 7686

Rochelle salt
- "textural" piezoelec. laminae, vibration anal. 1469
- voltage meas. under compressive load 1625
- domain structure in ferroelec. state 4481

Rock salt
- single crystals, fatigue, optical invest. 1993
- internal friction, *F*-centres effect 3725
- elec. strength rel. to crystallographic direction 5494
- electron density distrib. in lattice 7323

Rockets
- transportation ballistics problem 2219
- upper atm. research appl. 2842
  - density data 3769
  - atm. press. meas. for atm. temp. calc. 5804
- one-dimensional motion, relativistic theory 3891
- launching from high-altitude aircraft 6328
- tables for orbits 6499
- applications in astronomy 7381
  - solar spectroscopy 3815
  - equip. for solar spectrography 4567

Rotating bodies see also *Centrifuges; Earth, rotation*
- tops, rising by friction 2215
  - peg tracks 2216
  - friction influence on motion 2217
- cylinder, relativistic deformations 2933
- high-speed rotary apparatus, design and appl., review 4627

Rotatory power, dispersion see *Optical rotation*

Rubber
- as insulator, bibliography 828
- hysteresis 1986
- rheological extrusion theory 2771
- unvulcanized, effect of high-energy radiation 2789
- ultrasonic testing techniques 3065
  - thickness meas., phase lag method 59
  - Buna–N, swollen, study 2263
- mechanics, rigid rods model 3645
- thermal conductivity 4756
- heat evolved during extension and relaxation 5139
- plasticity, indust. meas. methods 5142
- rubbers suitable for expansion chamber membrane 5265
- theory of elastic deformation 6261
- elasticity, statist. thermodynam. 6262
- friction, velocity and temp. dependence 7224

Rubidium
- Rb_2Te photoemission 2460

Rubidium bromide
- *F*-band position 8776

Rubidium chloride
- RbCl–KCl, *F*-band position 8776
- RbCl–KCl mixed cyrst. *V*-band position 8778

Ruby
- decay of luminescence 6648
- natural and synthetic, magnetic susceptibilities 6954

Rutile
- elastic const. eval. from spectroscopic data 8721

***S*-matrix theory** see *Quantum theory, S-matrix*

Samarium
- identification in presence of Nd by crystallization in mag. field 7269

Sampling see *Statistical analysis*

Sapphire
- synthetic, white, magnetic susceptibility 6954
- neutron bombard. effect on susceptibility 6956

Scales, musical
- for freq. levels in octaves and semitones 5351

Scattering
- **acoustic waves**
  - in dispersion systems 1465
  - cylindrical waves, by cylinder 2283
  - from sea surface 5348
  - by interaction with turbulence 8295
- **electromagnetic waves**
  - in randomly inhomog. atmosphere 335, 4230
  - scatter sounding ionospheric research technique 561
    - 56 Mc/s, from lower ionosphere 4231
    - conference report 6976
  - cm-wavelength, by small obstacles 1780
  - radiowaves, by meteorological particles 1781
    - by atm. precipitation, particle charac. influence 2571
    - from aurora, theory 3458
    - reson. scatt. by meteor trails 3802
    - by melting ice particle 5809
- **light** see also *Raman spectra*
  - grating anomalies theory 167, 781
  - mol. wt. determinations, glycogens 519
    - unfiltered light use 520
    - potato amylopectin 2033
  - suspensions, rel. to wavelength 761
  - by macromolecules, pure solid polystyrene 782
    - multicomponent systems 784
    - stiff chain polymers statistics appl. 2799
    - polymer studies, reflectance correction 3186
    - v. stiff chain molecules 3187
    - polymolybdates invest. 5984
    - random coils, ang. distrib. 5985
    - scatt. factors, certain polydisperse systems 7615
  - by NaCl single crystal 783, 7613
  - refract. index 2 particles, additional functions 1561
  - radially symmetric, intensity recording 1562
  - particle size study with polarized light, in sol-gel transition 2027
    - unfiltered light 4745
  - from small drops, ang. distrib. 2390
  - in isotropic media, theory 3185
  - by liq., polarized components intensity temp. rel. 3188
  - by light, quantum electrodynamics 3864
  - coherent, by e.s. field, Dirac hole theory 3883
  - polarized light, by magnesia 4045
  - resonance excitation in Hg vapour 4678
  - molecular, in strong electrolyte dil. solns. 4744
    - in liquids, discrepancy 5425
  - by molecular chains, depolarization 5426
  - atmospheric indicatrix, props. 5810
  - by photog. layers, spectral distrib. 6362
  - by single droplets in cloud chamber 6676
  - monochromatic, by refract. index inhomogeneities, statist. mech. 7471
  - Rayleigh, in gas, line width 7611
  - fringes of equal thickness in white light 7612
  - Rayleigh's ratio for benzene, CCl_4 and toluene 7614
- **X-rays** see *X-ray scattering*

Scattering, particles see also *Collision processes; Nuclear forces, scattering; Quantum theory, S-matrix; Range of particles;* and under individual particles, e.g. *Alpha-rays*
- Univ. of Pittsburgh scattering project 270
- by rigid sphere, transient effects 625
- variational principles appl. 627, 2201, 3882
- shutter problem and diffraction in time 632
- high-energy *p-p* scatt. and assoc. polarization effects 913

Scattering, particles—*contd.*
- ang. distrib. formula 1110
- photons, lower limits for interaction times 1390
- large-angle, by atoms, electron ejection 1851
- Coulomb, interference in *p-p* collisions 1905
  - $n\hbar/2$ and $m\hbar/2$ collision, cross-section eval. 2194
  - of spin 0, $\hbar/2$, $\hbar$ particles, cross-section calc. 7453
- nucleons on nuclei, effective range concept 2195
  - nucleons of several hundred MeV 5301
- electrons by atoms, symmetry requirements 2198
  - integral eval. 7462
  - by He atoms, theory 6847
- multiple, corrections to impulse approx., 2-body system 2206
  - elastic, and radiation damping 2207
  - and many-body problem 2714
  - and plural, correction computation 2742
  - emitted by non-isotropic plane δ-source 2951
  - charged particles, peaked ang. distrib. calc. 3783
  - charged particles, Molière's theory 3881
  - theory, cloud-chamber appl. 4884
  - charged particles in foils, loss eval. 6088
  - charged particles 6475
  - charged particles, integro-diffl. eq. soln. 6476
- nucleon-nucleon, polarization effects 2502
  - high-energy charge independence test 3369
  - low-energy, short-range repulsion effect 4614
  - nucleons of several hundred MeV 5301
- stiff chain statistics, possible appl. 2799
- scattering potentials, construction 4616
- Fermi scatt. lengths in *n-p* scatt., differential eq. 4618
- *p-p* scattering amplitude expression 4872
- K molecular beam, by second beam 5110
- neutron-electron magnetic scattering, orbital effect 5302
- asymptotic description of scattering processes 5856
  - amplitude expression solution 3880
- resonance scattering in In 6218
- 3-body scattering problems 6478
  - variational principles 2201
  - exchange scattering 6477
- spin $\hbar/2$ particles Coulomb scattering 7447
- formal theory 7456

Schlieren systems
- vortex ring photography, shock tube 62
- microchronometric study of gas expansion from spark 186
- radial symmetry in image 1565
- u.s. wave visualization in phase-contrast microscopy 2286
- study of impinging jets 5884
- high-speed burning velocity cine-photog. 6716
- sound field photographs, turbulent jets 7522

Scintillation counters see *Counters, scintillation*

Seals see *Glass-metal seals*

Seawater
- dielectric properties, high freq. 833
- X-ray region absorpt., difference from pure water 880
- e.m. pulse propagation 3446
- rate of sea salt nuclei prod. 7355

Secondary electrons see *Electron emission, secondary*

Secondary emission see *Electron emission, secondary*

Sedimentation, colloids
- interferometric meas. method 159
- small glass spheres, size separation 479
- dil. soln., thermodynamical treatment 1596
- potential, nonequilibrium thermodynamics 1651
- ultracentrifuge cell for synthetic boundary production 2790
- microscopic glass spheres in water 3692
- by electrolyte, critical value 8032

Seismic waves see also *Seismology*
- *T*-waves, generated by submarine seisms 1270
  - interpretation 5788
  - underwater, refraction 5789
- Love waves in homog. crust on heterog. medium 2090
- refraction, in the Pacific 2091
- surface wave group study 4491

Seismographs
- portable type 2092
- magnetic tape recorder appl. 4490
- electromagnetic, charac. data 5224
- the combination seismograph, theory 7339

Seismology see also *Microseisms; Seismic waves*
- *S* waves detection in earth's inner core 556
- earth's interior thermal state appl. 557
- activity rel. to earth's rotation fluct. 5225
- high-frequency seismometry 7338

Selenium
- low abundance in meteorites 10
- liquid, optical properties, near i.r. 106
- rectifiers, relaxation phenomena 228
  - contact p.d. 852
  - temperature variation 4094
  - capacitance 4809
  - barrier mechanism 6783
  - d.c. charac., theory 8423
- opt. and elec. charac. (book) 234
- amorphous, structure 1179
- hexagonal crystals, Brown effect invest. 2459
- use for photographic image production 2873
- hexafluoride, dielec. strength and chem. props. 407
- nuclear magnetic resonance 5657
- amorphous and hexagonal, optical absorpt. an reflection 5966
- crystall., low-temp. sp. ht. 6736
- photocells, charac. explanation 6793
- refractive index, 5–15 μ 7547
- liq. and hexagonal, electrical properties 7691
- thermoelect. power 7692

Semiconductors see also *Conduction, electrical*
- minority carriers, i.r. absorpt. rel. in Ge 130, 6780
  - lifetime meas., Ge 844, 849
  - overlapping, energy states 846
  - photoelec. devices using carrier injection 861
  - green SiC crystal light emission effect 1554
  - PbS, carrier injection and extraction 3301
  - recomb. rate, Ge, by pulsed reverse charac. 4091
  - transport in homogeneous semiconductors 6778
- Pt films with evap. dielec. layer 218
- distribution of transistor action 219
- phosphors, conductivity mechanism 220
- porous, properties 222, 4089
- mobilities, electrons in Ge 221
  - electron and hole, in Ge, diffusion const. rel 1636
  - drift, meas. 3300
  - drift, in Ge, temp. dependence 4801
  - charge carrier, temp. dependence 5467
  - hole and electron, in high fields 6044
  - high-field, with impurity scattering 6045
  - pulse drift, rel. to charge carrier ditto 6777
  - current carrier, ratio 7670
- thermally induced acceptors in Ge, activation energ 223
  - by quenching from high temps. 847
  - mechanism 8405
  - rel. to Cu content 8406
  - vac. heat-treated Ge 8409
- sputtered CdO, semicond. props. rel. to struct. 224
- photoconductivity (book) 234
  - photoelec. devices using carrier injection 861
  - i.r. photoconductors, review 8424
- as thermionic emitters 297
- Debye absorption, causes 749
  - lattice defects, study 1623
- digest of literature 828
- resistance, to 100 000 kg/cm², of 3 compds. 837
- physical processes in semiconducting complexes 843
- grain boundary barriers in Ge 845
- NiS, as intrinsic semiconductor 848
- Hall effect studies, review 985
  - sintered PbS 226
  - *n*-type Sb-doped Ge 227
  - adiabatic Hall effect 4808
  - current carriers conc. distrib. 6038
  - molybdenite 6768
  - isothermal Hall effect, theory 6978
  - diffusion currents 7671
  - Cu$_2$O, below room temp. 8403
  - InSb 8410
  - TiO$_2$, ceramic and single crystal 8414
- effect of plastic deformation, Ge 1190
- BaFe$_{18}$O$_{27}$, new ferromag. crystal, high anisotrop 1263
  - new method of melting 799

miconductors—*contd.*
  noise, Bernamont's results modfn. 1634
    meas. on thin PbS photolayers 2448
    shot noise origin 4095
    at v. low freq. 4800
    surface layer 4806–7
    contact 6043
  conductance modulation by elec. field 1635
  intermetallic compds. props. 1638, 3298, 3306, 4804, 6773
    InSb, magneto-resistance effect 4816
    AlSb, InSb, single cryst. prep. 8051
    InSb, Hall effect and conductivity 8410
  elec. and photoelec. surface properties, Ge 1637
  struct. defects, h.f. spectroscopy study, ZnO 1640
  activation energies, B 1641, 5468
  conducting props. rel. to temp., Cu_2O 2447, 8402
  photoelec. emission, transition probability 2449–50
  Cs_2Te and Lb_2Te, photoemission 2460
  crystal imperfections (book) 2810
  forbidden gap values, PbS, PbSe, PbTe 3299
    Te 4088
  graphite interstitial compds. 3302
  magnetoresistive effect, theory 3303
    and cyclotron resonances and Brillouin zones 4805
    InSb 4816
  thermo- and galvano-magnetic coeffs. 3304
  perturbed periodic potentials 3480
  granular aggregates, dielec. behaviour, Mg ferrites 4080, 7661
    nonlinear resistors, SiC 8415
  capacitance effects, PbS and Te thin films 4093
  reversible effect in metallic deposits 4797
  extremely degenerate, low-temp. conduction 4802
  temporary traps in Si and Ge 4803
  disturbance-centre (PbS) superconductivity 4814
  electronic conduction, SiC 5469
    polar semiconductors, theory 6781
  Faraday effect, theory 5598
  thermal conductivity meas. 5992
  dielec. const. and loss angle meas. 6032
  mixed, theory 6039
  radiative transitions in electron-hole recomb., Ge 6040
  thermal disordering process for $n \rightarrow p$-type, Ge? 6041
  props. of systems K–Sb, Cs–Sb, K–In, Cs–In 6042
  space-charge limited emission 6046
    hole current, Ge 6047
  semicond. thermoelec. matls., thermocouples appl. 6733
  $B^{12}Al$ and B^4C, behaviour 6774
  impurity ionization, chem. effects 6776
  Li diffusion into Ge and Si 7196
  X- and γ-ray effect on conductivity, CdS 7668
  n-type surface conductivity on *p*-type Ge, 7669
  "swept intrinsic" config., d.c. field distrib. 7672
  Ag–Cs_2–Cs photocells pulse irradiated 7678
  thermoelectric power studies 7692
    (BaSr)O and BaO 225
    p-type Si 244
    molybdenite 6768
    contacts on Mg_2TiO_4 6779
    Se 7691
    MgO 8411
  film, effect of light on refract. index 8308
  temp. meas. in h.f. fields 8378
  electron spin, statistics 8400–1
    resonance, Si 6775
  O-induced surface acceptor levels in Ge 8407
  MgO, props. 8411
  Cr_2O_3–Al_2O_3 catalyst (I), semiconductor props. 8412
  circuit elements, review 8413
ries see also *Fourier series*
  numerical, moment of inertia calc. appl. 2213
  a trigonometric series, physics appl. 2890
  power-series expansion of unitary operator $U(t_1t_0)$ 6378
  slowly converging, summation 7373
ock waves see also *Explosions; Supersonic flow*
  vortex ring formation at tube open end 62
  2-dimensional, singular directions distrib. 78
  thermal, rel. to fusion 180

Shock waves—*contd.*
  in spark discharges, l.p. 251
    Schlieren photograph 1565
  detonation, liquid and solid explosives 503
    non-ideal, X-ray invest. 2005
  attached, in non-stationary flow, tips curvature 660
  supersonic projectile flow pattern 661
  spherical blast, initial behaviour 678
  theory of structure 679
  plane, interaction with rough surfaces 680
  shock tube studies in high temp. gases 681
  diffraction by right-angled wedge 690
  effect on skin friction 1432
  origin, in burning gas efflux 1433
  gradients and log. derivs., limitation by Chapman's formulae 1449
  meson production as shock wave problem 1942
  refraction of cracks caused by shocks 1950
  nonlinear dissipative distortion 2262
  strong, flow field resulting from diffraction 2265
  attenuation in shock tube 3042
  magneto-hydrodynamic 3799
    in plasma 8583
  detachment from wedge leading edge 3930
  shock tube meas. of sound vel., gases 3943
  shock front shapes in A, H, N, O 3945
  luminosity generation 3946
  thickness calc., in A 5340
    by appl. of polynomial distributions 7511
  propagation in liquid He II 5445
  detached, in stationary flows, determination 6514
  interaction with turbulence 8295
Shot noise see *Fluctuations, electrical*
Showers see *Cosmic rays, showers*
Silica
  vitreous, struct., i.r. reflection study 1519
  shadowed silica replica prep. 6257
  neutron bombard. effect on susceptibility 6956
Silicon
  opt. and elec. charac. (book) 234
  p-type, thermoelectric measurements 244
    temporary traps 4803
  atomic heat below 100°K 817
    neutron bombard. effect 1801
  rectifiers, temp. effect. and neg. resist. 850
    thermal treatment effect 2451
  important in electronic devices 851
  single crystals, plastic deformation 1190
  plastic flow analysis 1191
  single crystal rods growth 1245
  i.r. photoconductivity, due to neutral impurities 2462
    low temps. 3312–13
  elast. moduli and internal friction temp. rel. 2765
  Si/Ag ion system, photog. behaviour 2874
  and PbTe, optical constants inter-rel. 3094
  superconducting compounds 3316
  diffusion in ferrite 4404
  solubility in Ga and In 4646
  crystallization from floating liq. zone 5195
  electron and hole mobility, high fields 6044
  crystal, energy band struct. 6312
  semiconductor, electron spin resonance 6775
    as circuit element, review 8413
  elec. resistivity and thermionic emission 6906
  as impurity in cathode base, Ba_2SiO_4 formation 6916
  isotopic constitution 7059
    ratios from tetramethyl mass specta 3393
  Li diffusion into 7196
  liq., surface tension 7490
  C_p–C_V 7641
  single crystal and fused, low-temp. elast. const. 7989
Silicon carbide see also *Carborundum*
  crystals, rel. between symmetry and growth 1243
  electronic conduction, theory 5469
  macroscopic growth spirals, theory 7280
  granular aggregate, nonlinear resistor theory 8415
Silicon oxide see also *Cristobalite; Quartz; Silica*
  unbacked thin films prep. 1178
  film transparent in far u.v. 7582

A complete list of the Subject Headings will be found at the end of the Index.

Silver
- films, opt. const. det. 158
  - electrons, mean free paths 214
  - contamination by source matl. 484
  - on Ta, contact potl. meas. 826
  - u.v. optical constants 2318
  - sec. electron emission primaries below 10eV 2494
  - metal surface replica appl. 2760
  - elec. conductivity phenomena 4797
  - secondary electron emission rel. to thickness 5520
- radiation damage and recovery 216
- atomic weight, chem. and phys. values 392
- low temp. atomic heat anomaly 816
- *L* spectrum, conductivity band and colour 879
- self-diffusion, cyclotron bombardment effect 1171
  - impurities effect 1960
  - at surface, single- and polycrystals 7195
- deformation at high temp. 1982
- anomalous skin effect invest. 2458
- Si/Ag ion system, photog. behaviour 2874
- change of resistivity on deformation 3657
  - wire, cold working effect 4109
  - Ag–Cs phototubes, fatigue 4101
- gas-coated surface, work function 4179
- thermoelec. power at liq. He temp. 4817
- crystals, growth and slip patterns 5196
- surface tension at m. pt. 5323
- thermal cond., low temp., mag. field 6698
- thermionic constant 6905
- photoemission into AgCl, KBr, NaCl 7679
- tarnishing, AgCl film linear growth 8049

Silver bromide
- between $AgNO_3$ and KBr solns., ionic mobility 2011
- u.v. absorption coeff. 2360
- films, behaviour under fast electrons 3643
- polyhedral sub-structures in photog. process 6354
- polycrystall. film for photocond. meas., prep. 6799
- cryst., expts. on reduction 8162
- electron microscope exam., irradiation effect 8716

Silver chloride
- optical investigation of plastic deformation 491
- charged particle ionization loss, density effect 932
- acoustic wave elastic spectrum from X-ray scatt. 4472
- single crystals, elasto-plastic stress-optical effect 6678
- new photosensitivity bands 7679
- film, linear growth in Ag tarnishing 8049

Silver halides
- oriented layers, decomposition 1966
- with admixture, irrad. intensity effect in photochem. reactions 5166

Silver iodide
- nucleating properties, effect of r.h. 8128

Silver nitrate
- action on sphalerite cleavage face 4470

Silver sulphate
- action on sphalerite cleavage face 4470

Silver sulphide
- β–Ag_2S, optical absorpt. temp. dependence 2338

Sintering
- theory, review 3627
- volume changes and diffusion 3628
- in compressed metal powders 7967

Skin effect
- anomalous, optical region theory 1556
  - Bi, mean free path calc. 2444
  - comparison with theoret. values, several metals 2458
  - in metals, microwave meas. 6786
  - and reflectivity in metals 6787–8
- influence on diff. low of noise 5466

Sky brightness see also *Night sky; Twilight*
- O_3 effect, particularly at twilight 2852

Slip
- metals, surveys 490, 7221
- theory of kinking 533
- in Al, electron microscope study 1183, 6252–4
  - long crystals 6267
- Ge and Si, mechanism 1191
- in Ag high temp. deformation 1982
- criterion for onset in metallic polycrystals 1984
- in metal work-hardening theory 1991, 7996
- mech. deform. effect on growth, CdI_2 2044

Slip—*contd.*
- dislocations, theory, review 3648
  - interaction, magnetic analogue 3649
  - shear stress in dislocations array, rel. to hardeni 3663
  - interaction with sound waves 6268
  - and plastic flow, crystals (book) 7275
  - modes in cubic lattices 7297
  - demonstration model of crystal dislocations 805
- exudation at slip bands, cyclic stressing 3668
- glide in crystals, in plastic deformation 4419
  - metals, pure glide 7212
- slip line field in plastic flow 5143
- Fe, Neumann bands X-ray microbeam study 5736
- occurrence in diamond 8047
- crystals, interaction with grain boundary moveme 8725

Smokes see *Aerosols*

Snow
- microwave attenuation and scatt. 2571
- radar observation 2848
  - location techniques 1287
  - grouped layer growth 4502
- nuclei, electron microscope study 5245–6
- snowflakes, fall velocity 5808
- friction of runners on 7226
- luminous directional reflectance 7603
- atm. radioactivity and pollution measurements 813
- snow water, radioactivity decay curve 8647

Sodium
- heat of fusion, transformation press. effect 1577
- change of vol. on melting, rel. to transform. press 1578
- vapour, thermodynam. props. from spectroscopi data 1597
- elec. resistance temp. dependence 1644
- soln. in liq. NH_3 2245
- self-diffusion in NaCl, X-rays effect 4406
- absorption of light in vapour 6644
- low-temp. thermoelectricity study 7690

Sodium acetate
- solutions, u.s. velocity dispersion 6555

Sodium carbonate
- anhydrous, transition points 6713

Sodium chloride see also *Rock salt*
- crystals, light scattering 783, 7613
- colour centres, at 5°K 1251
  - *F*-band absorpt., enhancement by Ca^{++} 128
  - generation by electrolysis 2061
  - and free Na presence 3727
- partial molal vols. calc. 1998
- impure, dielectric losses 3293
- crystal, elec. strength temp. rel. 3342
- Na self-diffusion, X-rays effect 4406
- strain-optical constants, molec. interpret. 5427
- dielec. const. meas., u.h.f. 7660
- electronic Hall effect 8600

Sodium fluoride
- NaF dimerization 8039

Sodium iodide
- NaI(Tl) crystals, cosmic-ray μ-mesons energy loss 94

Sodium phosphates
- dielec. const., 9500 Mc/s, rel. to temp. 831

Soil
- soil mechanics and plastic analysis 1167
- clay bed settlement under conc. load 1175
- magnetic susceptibility 1272
  - causes of high susceptibility 5792
- thermal conductivity, measurement 1570, 2399
  - frozen soil 3229
- mechanics, gasdynam. method appl. 1956–7
- hydraulic permeability, *in situ* meas. 2750, 3634
- absorption of γ-rays and neutrons 5043
- resistivity, local lightning risk 7364
- dielec. const. meas., u.h.f. 7660

Solar system see also *Planets, etc.*
- cosmogony 1338
- astrophysics symposium (book) 3795
- solar nebula origin, information from comets 6400

Solid solutions see also *Alloys; Phase equilibrium*
- metallurgical equilibrium diagrams (book) 482
- ordered Cu_3Au, CuAu, effect of cold work 485

olid solutions—*contd.*
- In–Tl, elec. resistivity 839
  - superconductivity 863
- substitutional, atomic mobility anelastic meas. 1160
  - porosity development during diffusion 1172
- naphthalene-d_8 in naphthalene, i.r. study 1518
- polygonization during diffusion 1964
- effect of O in Fe on mag. props. in a.c. fields 2539
- binary, atomic distrib. 2583–5
- variable diffusion coeff., analytical calc. 2751
- Cu$_3$Au, isothermal ordering rate 2753
- In–Pb system equilib. diagram 2754
- Cu–Si, shear const. changes due to alloying 2764
- metallic surface friction, solubility effect 2773
- β-brass disordering by α-bombard. 3731
- impurities solubility in Ge crystals 4090
- In distrib. coeff. in Ge 4407
- binary, Young's mod. rel. to comp. 4418
- Fe containing V and N, anelastic effects 5123
- Al–Zn, X-ray evidence of clustering 5731
- dihydrogen and dideutero phosphates and arsenates, transition temps. 6003
- boron carbide structure 6249
- (U, Th)O$_2$, lattice consts., mag. suscept. 6953
- crystal density changes on forming solns. 7288
- plastic, of organic fluor., scintillation 7592
- Vegard's Law 7814
- binary, short-range order effect on elec. resist. 7816
- supersaturated, decomp., theory 8045

olids
- **structure** see also *Crystal structure; Examination of materials; Granular structure; Vitreous state; X-ray crystallography*
  - paramag. reson. in cryst. solids 124
  - sputtered CdO layers 224
  - plasticity conf. rep. 1192
  - amorphous Se 1179
  - ZrSiO$_4$, He diffusion after α-particle damage 1426
  - 6 tetrasubstituted methanes, microwave dielec. dispersion 1612
  - molec. motion, proton mag. reson. study 1827
  - crystalline and amorphous, bond differences 1955
  - cokes, X-ray scatt. invest. 1970
  - compared with liquids 2237
  - β-Ag$_2$S optical absorpt. temp. dependence 2338
  - metals. shear strain effect on Fermi surface 2469
  - C, Si and O surface phases on Ni 2477
  - frequency spectra from spec. ht. data 2582
  - crystal imperfections (book) 2810
  - solid methane, from nuclear mag. reson. 3474
  - neutron diffraction appl. 3626
  - dislocation model of deformation bands 3659
  - β-brass disordering by α-bombard. 3731
  - changes in fatigued metals 4426
  - phys. chem. treatise (book) 5147–8
  - diamond, electronic struct. 5202
  - microwave spectroscopy, specially lattice defects, review 5606
  - diamond and zincblende type, rel. to elec. conductivity 6033
  - electron distribution from magnetic meas. 7791
  - Portevin–Le Chatelier effect in Al 7992
  - Ag–Al alloy structure, X-ray study 8102
  - Raman effect in solids, review 8336
  - C, lustrous layers 8713
  - Sb, amorphous 8715
  - Bi and Sn films, loosening 8717
  - metal carbides and nitrides, type MX 8795
- **theory** see also *Crystals; Dielectrics, theory*
  - quantum theory of matter (book) 26
  - noble metals light absorpt. rel. to van der Waals interaction energy 139
  - Cu$_3$Au, cohesive energy and ordering 343
  - graphite electronic band struct. 344
    - π-electrons momentum distrib. 345
    - lattice vibrations 991
    - interplanar cohesive energy 1169
  - BN, electronic band structure 346
    - electrostatic energy 7815
  - earth's interior thermal state appl. 557
  - "transistors" review 854
  - magnetic dipoles space quantization and orbital momentum quenching 970

Solids—*contd.*
- **theory**—*contd.*
  - metals, creep under deuteron bombardment 1194
  - paraffin wax, surface free-energy 1415
  - plane and space lattice of similar atoms 1797–8
  - interatomic force, non-linear approx. 1800, 8610
  - Si low temp. atomic heat, neutron bombard. effect 1801
  - adsorption, surface states 2032
  - zero-point energy and crystal θ values 2056
  - compared with liquids 2237
  - thermal expansion 2405
  - 2nd sound propag. conditions calc. 2420
  - bound electronic states due to "potential hill" 2446
  - Al cohesive props. 2581
  - cluster variation method 2965
  - regular mixtures theory, approx. methods 3009
  - phase trans. in solid H halides 3242
  - internal photo-effect, quantum-statist. treatment 3473
  - combined pairs of vacancies, Cu 3476
  - electrons in metallic lattices, entropy 3477
  - Bloch wall energy, band picture 3478
  - metal surface energy det. 3479
  - perturbed periodic potentials 3480
  - nucleation, review 3714
  - order-disorder in Cu–Pt alloys 3718
  - order-disorder in Fe–Ni alloys, FeNi$_3$ region 3719
  - collapse of vacancy aggregates 3724
  - Fermi energy effect on superlattice stability 3728
  - electron bombard. effect on order, Cu$_3$Au 3730, 8452
  - dislocation theory appl. 3732
  - 2nd-neighbour interaction, regular binary assemblies 4238
  - solid methane, state, from nuclear mag. reson. 4239
  - transition metals, electronic struct. 4240
    - valency in alloys 8035
    - group theory and quantum mech. 8611
  - PbS electronic band struct. 4241
  - nearly free electrons in metals, exchange energy 4242
  - electron/lattice vibr. interact., metals 4243
  - lattice vibrations in binary superlattice alloy 4244
  - superlatt. alloys, vibr. spectrum and spec. ht. 4245
  - Cu$_3$Au, disorder-order trans., kinetics 4408
  - Matthiessen's rule validity in deformation 4422–3
  - slow electron self-energy, polar matls. 4476
  - superlattices in ternary alloys 4485
  - thermal conductivity, low temp. 4757
  - ferroelectricity (book) 4785
  - ferromagnetism and order in Ni–Mn alloys 4910
  - free electron and generalized Thomas–Fermi models, virial theorem 4939
  - periodic lattices and artificial dielec., variational methods 4940
  - vibration freq. in diatomic molecules and in solid metals 4941
  - anelastic effects in Fe containing V and N 5123
  - phys. chem. treatise (book) 5147–8
  - atomic vibrations, effect on paramag. and sp. ht., ferromag. metals 5607
  - annealing effects in irrad. Cu 5608
  - chemistry of, and electron diffraction, review 5786
  - Bi near i.r. optical props. interpret. 5967
  - spec. heat theory 6016
  - order-disorder equilib., high temp., statist. 6158
  - nuclear radiations, effects on mech. props. 6219
  - bombardment damage annealing expression 6272
  - Brillouin's free-spin, deviations in Mn fluosilicate 6309
  - in thermo-dielectric effect, theory 6762
  - freq. changes with temp. and vol., statist. theory 6979
  - symposium 6981
  - room temp. disorder in crystall. 2,2-dinitropropane 7293
  - short-range order in Cu$_3$Au 7294
  - alkali metals, solutions in liq. NH$_3$ 7503
  - cold work and anneal effect on elec. resist., α-brass 7667
  - low-temp. thermoelectricity invest. 7690
  - rotational phase transition 7812
  - interionic forces in metals 7813
  - Vegard's Law 7814
  - short-range order influence on alloy elec. resist. 7816
  - electron theory of metals, difficulties 7817

- **Solids**—*contd.*
  - **theory**—*contd.*
    - matter tensors in symmetrical systems 7965
    - low temp. thermal energy (book) 8366
    - semiconductors, review 8413
    - magnetic susceptibility of Br-graphite 8513
    - saturation moment, ferromag. alloys 8516
    - antiferromag., molec. field treatment, review 8517
    - exchange interactions, review 8521
    - band theory of ferromagnetism, review 8522
    - collective electron theory of ferromag., review, 8523
    - exchange coupling models, ferromag. media 8524
    - new results on ferro- and antiferromagnetism 8532
    - electron-lattice interaction, model 8607
    - a minimum prop. of the free energy 8608
    - co-operative electron phenomenon in dil. alloys 8609
    - elect. interaction of dislocation and solute atom 8612
    - nuclear mag. relax. in crystall. solids 8771
    - elastic spectra from sp. ht. data 8772
    - order-disorder transitions in alloys 8773
    - phase transitions, lattice defects and Debye phenomena, rel. 8774
- **Sols** see also *Colloids; Sedimentation*
  - lyophobic, stability 1227
  - sol–gel transition, particle swelling 2027
  - flocculation by electrolyte, critical value 8032
- **Solubility** see also *Phase equilibrium*
  - BaF_2, CaF_2, compared 489
  - H, O, A and He, in Pyrex at 1170°c 3925
  - Si and Ge in Ga and In 4646
  - solid metal and nonelectrolyte, correl. 5894
  - in compressed gases, review 7500
  - H in liq. metals 7502
- **Solution energy** see *Heat of solution*
- **Solutions** see also *Heat of solution; Liquids; Solid solutions*
  - co-operative orientation effects 65
  - entropy of soln. of nonelectrolytes 66
  - multi-component mixtures, free volume theory 67
  - polymer, 3rd virial coeff. 68
  - mixed salts, optical props. 69
  - non-aqueous, conductance 231
  - miscibility, effect of shear rate 653
  - strong electrolytes, statistical theory 654–5
  - ionic relaxation, cause of sound attenuation 683*
  - Ba/$BaCl_2$ system, miscibility break 1423
  - of charged particles, dielec. constants 1610
  - composition of surface, adsorption kinetics 2030
  - polymethylacrylic esters, phase separation 2037
  - particle space requirements, statistics appl. 2244
  - Na in liq. NH_3, electron stability 2245
  - quantitative expression of mixing 2249
  - Maxwell's effect, molecular form fluctuation influence 2250
  - macroscopic charge formation in interior 2431
    - calc., in elec. field 2432
    - visible distribution 3007, 8012
    - importance in electrolytic processes 7245
  - activity coeffs., Bagchi's calc., Gronwall's method 2786
  - high polymers, hydrodynamics 2989
  - polymethyl methacrylate, hydrodynam. behaviour 3005
  - rapid determination of diffusion coeffs. 3006
  - molecule interact. energy rel. to orientation 3008
  - cell model, mixing nonrandomness influence 3010
    - specific molar quantities 3011
    - statist. thermodynam. appl. 3918
  - statistical thermodynamics, critical soln. phenomena 3012
    - *r*-mer solutions 3917
  - iodine-solvent interaction, rel. to I_2 dissoc. 3134
  - He^3–He^4, vapour-liq. equilibria 3253
  - strong electrolytes, aq. space requirements and activity coeffs. 4641
  - dilute, strong electrolytes, Rayleigh scatt. discrepancy 4744
  - polymer, viscosity mech. 5317
    - rel. to frequency 1405
    - conc., high polymers, flow double refract. 5316
    - viscoelastic props. 5872
    - polystyrene–decalin, dynamic mech. props. 5876
    - coiling polymers, linear viscoelastic props. 6510
- **Solutions**—*contd.*
  - excess volume on mixing, test of theory 5448
  - electrolytic, invest. by ultrasonics 5747
  - steel in H_2SO_4, influence of u.s. 5766
  - crystals, electric charging phenomena 5895
  - ionic, thermodynam. functions from Mayer's theor 6021–2
  - aq. of amino acids and isomers, u.s. compressibilit study 6534
  - propanol-1, H bonding rel. to solvent 6629
  - electrolytic, pulverizability and surface struct. 7250
  - e.s. free energy calculations 7473
  - aqueous, ionic, density meas., r.f. method 7484
  - cryoscopy in molten $LiBO_2$ 7492
  - co-operative orientation, quasi-chem. approx. 7501
  - alkali metals in liq. NH_3, theory 7503*
  - fluorocarbons and hydrocarbons, energy of mixin 8006
  - non-aqueous, electrochemistry 8011
  - protein molecules, interactions, rel. to adsorpt. o proteins 8041
  - limiting laws for infinite dilution 8268
  - ionic, dielec. const. conc. dependence 8388
- **Sound** see *Acoustics*
- **Sound ranging**
  - in medium of unknown velocity 3075
  - echo ranging with audiofrequencies 3076
  - porpoise sounds as sonar signals 4675
  - time interval meas. 8250
  - underwater echo, spark source 8300
- **Sound recording**
  - spatial distortion concept appl. 721
  - magnetic recording tapes, magnetic anisotropy 965
  - automotive noise, binaural tape recording 1475
  - rooms, Berlin, reverberation times 4672
  - disk recording calibration, light pattern meas. 5368
  - tape storage technique for transducer meas. 6560
  - magnetic recording media 8581
- **Sound reproduction** see also *Acoustic radiators, transducers; Sound recording*
  - loudspeakers, reverberation meas. device 96
  - spatial distortion concept appl. 721
  - rooms for, Berlin, reverberation times 4672
  - electrodynam. loudspeakers, distortion meas. (book) 7531
- **Space charge**
  - electron beams, defocusing 261
    - shadow 266
    - space-charge waves, Lorentz force effect 4834
    - waves, interact. in crossed fields 4836
    - spreading photographed 5512
    - waves in electron streams 6965
  - pos. and neg., in atm. air, fine weather 1293
  - at semiconductor free surface 1637
  - rel. to current density in field emission 2479
  - current saturation explanation, ball of fire discharge 3333
  - reduction of flicker effect, electron tubes 4173
  - of atmosphere, meas. 4516
  - effect on emission in semiconductors 6046
  - effect on hole current, Ge 6047
  - layers, in "fused-impurity" *p–n* junctions 6049
  - in elect. arc, near electrode, theory 6815
  - requirements in ideally focused electron-optical systems 6839
  - thickness of layer near surface, ionic crystals 7298
  - fields, electron path tracing, rubber membrane 7712
  - build up in alkali halide crystals 8397
  - in elect. discharges, review 8427
  - effect on ionization chamber saturation props. 8469
- **Spallation** see *Nuclear spallation*
- **Sparks, electric** see also *Breakdown; Lightning*
  - gaseous expansion from, Schlieren study 186
  - l.p. discharges, shock waves 251
  - electronic timing device 638
  - light decay to v. low levels 867
  - N_2, formative time lags 869
  - growth study, electro-optical effect camera shutters 2133
  - vac., between Al, Mg, Cu, C electrodes, emission charac. 3096
  - long-gap, neg., in air, mech. 3328
  - spark line prod. in He, air and A 3338

- **Sparks, electric**—*contd.*
  - spectral lines, intensities rel. to time 3975
  - h.p., $H\alpha$ line self-reversal 4700
  - sphere-plane spark gaps, air 4820
  - luminous electrode spots behaviour 4821
  - sparking potls., separating contacts 5486
  - generator, for 100 kV condensed discharges 5487
    - low-voltage, spectroscopic anal. 7556
  - H spark channel properties 6818
  - condensed in vacuum, light emission 7704
  - echo sounding appl. 8300
  - mechanism in gaseous discharges 8430
- **Specific heat** see also *Calorimetry; Heat capacity; Thermodynamic properties*
  - transport props. relationships, gases 79
  - poor conductors, rapid det. 795
  - ammonium dichromate, new transition meas. 800
  - Pb, 1°K to 75°K 815
  - Ag low temp. atomic heat anomaly 816
  - Si atomic heat below 100°K 817
  - ethyl alcohol vapour heat capac. rel. to press. 822
  - Debye theory, graphite lattice vibrations appl. 991
    - surface contrib. 7640
  - Cr alums, low temp. 1573
  - MnO, anomaly, explanation 1592
  - Cr_2O_3, anomalous, at antiferromag. Curie temp. 1593
  - θ values in metals 1594
  - Na vapour, from spectroscopic data 1597
  - $CHClBr_2$ and $CDClBr_2$ 1804
  - compressed CO_2, const. vol., apparatus 2426
  - CO, tables, 0–150°C, up to 3000 atm. 2428
  - simple solids freq. spectra deriv. 2582
  - liquids, calc. from gas 2999
  - $CuCl_2.2H_2O$, 1·5 to 20°K 3269
  - anomalous, of ferrous and Zn ammonium sulphates 3270
  - low temp., of Ga, T_2 dependence 3271
  - NpO_2, low temp. 3273
  - anomalous, Ce salts, elec. quadrupole coupling influence 3502
  - graphite, v. low temp., statist. expression 3716
  - Pd–Ag alloys, 11 to 20°K 4064
  - vibrational, binary superlattice alloys 4245
  - UF_6 −60° to 100° 4634
  - low temp., Te 4771
  - ratio, gases, from explosive combustion, det. 4772
    - A, at high press. 4773
    - Si and Ge 7641
    - A and N, ultrasonic meas. 7642
    - N, under press., u.s. det. 7643
    - rel. to press., from u.s. dispersion meas. 7523
  - N, A, CO_2, N_2O, SO_2, ratio, resonance method 4774
  - quantum theory (phys. chem. textbook) 5148
  - unsaturated liq. He film 5440
  - diamond, low temperatures 5446
  - ferromag. metals, effect of atomic vibr. 5607
  - gases, det. simultaneously with thermal conductivity and viscosity 5896
  - In atomic heat, 12°–273°K 6014
  - low temp., of BN, T^2 dependence 6015
  - solids, theory 6016
  - crystall. Se, low temp. 6736
  - discontinuity in antiferromagnets and ferrites 6942
  - V_2O_5, near transformation temp. 6951
  - CeMg nitrate, 1°K to 4·2°K 7630
  - Be, 4°K to 300°K 7633
  - C_p–C_v in Si and Ge 7641
  - solid O below 4°K 8384
  - Nd ethyl sulphate, near 1°K, nuclr. and electronic contrib. 8385
  - glasses, review 8710
  - solids, elastic spectra from sp. ht. data 8772
  - W oxides, high temp. 8796
- **pectra** see also *Absorption; Astronomical spectra; Atmospheric spectra; Colour; Luminescence spectra; Mass spectra; Raman spectra; Spectrochemical analysis; Spectroscopy; Stark effect; Zeeman effect*
  - microwave, molec. struct., det. appl. 1822
  - microwave freq. stabilization, atomic clocks 2162
  - rotational, asymmetry doublets, $(K + 2)nd$ order formula 3500
  - spark discharges, short period investigations 3975

- **Spectra**—*contd.*
  - radiation induced by α-particles in thin films 4449
  - excitation, of macroscopic systems, theory 5307
  - molec. i.r. emission, by glow discharge 6824
  - nuclear quadrupole moments det., error 7043
  - **continuous**
    - h.p. Hg vapour discharges, struct. 1496
    - CO_2, methane, ethane, propane, propylene, H_2O, air, i.r. emission in glow discharge 1663
    - Hg, green continuum enhancement by rare gases 1665
    - absorption, intensity distrib. calc. 2344
    - vac. spark disch., Al, Mg, Cu, C electrodes 3096
    - photoelec. absorpt. in Li vapour 4014
    - intensity distrib., rel. to temp. and γ_2 4697
    - A, at ~ 10 mm Hg 5382
    - condensed sparks in vacuum 7704
    - Mg vapour, absorption 8325
    - a.c. carbon arc, intensity and temp. meas. 8431
  - **flames**
    - K, impurities influence on line intensity 727
    - HBr emission 739
    - nonhomogeneous, intensity of lines 1489
    - OH apparent rotational temps. study 1490
      - diluted flames 2410
      - emission, 1·4–1·7 μ, oxyacetylene flame 3113
      - line shape effect 3985
    - H, diffusion, atomic Na formation 2319
    - CH rotational and vibrational "temps.", atm. press. 2409
    - air-acetylene, ionization effects 3122
    - H_2–O_2, rotational temps. 3150
      - $OH(^2\Sigma^+)$ formation, adiabatic correl. rules 4440
    - explosion phenomena observations 3152
    - acetylene, free radical absorption 3246
    - C flame method, pure band spectra appl. 4692
    - "curves of growth" 4706
    - Sc, Y, La, Ce, Pr, Nd, Sa, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu 5942
    - OH, CH, HCO formation 7233
    - double-base powder, i.r. absorpt. 7579
    - chemiluminescence phenomena during hydrocarbon combustion 8342
  - **resonance** see also *Luminescence spectra*
    - Hg, quenching, metastable $(^3P_0)$ atoms prod. in N_2H_2, C_2H_4, C_2H_6, O_2, CO_2 733
    - from H flames containing alkali metals 4003
    - noble gas metastable states 4290
  - **X-ray** see *X-ray spectra*
  - **atoms** see also *Atoms, excitation, structure*
    - Fe, and other metals, forbidden lines 115
      - ferromag. resonance absorpt. 8553
    - $Hg^{199, 200}$ isotopes, energy levels and wavelengths 117
    - Eu, Gd, Yb, isotope displacement constants 118
    - He, intercombination lines intensity, theory 732
      - triplets fine structure 1498
      - 12 000–19 000 Å 2330
      - ^3S, hyperfine structure 8641
      - nuclear structure correction 8642
    - Ta II h.f.s., in nuclear moments calc. 1034
    - H I$(2^2P_0 - n^2D)$ lines, elec. field effect 1495
    - He I vac. u.v. intensities 1497
    - Pb I, isotope shift 1499
      - λ4058 Å line, h.f.s. 1501
    - Gd I, isotope displacements 1500
      - h.f.s. 5947
    - $Th^{230, 232}$, isotope shifts 1502
    - Na, splitting factor from spin resonance absorpt. 1602
    - H and D Lamb shift, corrections 1849
    - auroral H lines enhancement towards lower latitudes 2102
    - O I, enhanced forbidden line, sunlit aurora 2103
      - Hartree–Fock eq. appl. 3533
      - in lightning, λ6159–7157 Å 5255
      - $(^4S^0)3p^3P$ term, fine struct. 5948
      - in long discharges in air 6600
    - Xe 12 000–19 000 Å 2330
    - A, 12 000–19 000 Å 2330
      - vacuum wavelengths 6608
    - Kr, 12 000–19 000 Å 2330
    - Ne 12 000–19 000 Å 2330
      - intensity distrib. for various disch. conditions 4696
    - neutral O, isotope shift 2333
    - Re, arc and spark 3103

A complete list of the Subject Headings will be found at the end of the Index.

Spectra—*contd.*
atoms—*contd.*
Hg, λ2537 line, new h.f.s. meas. 3105
5461 Å h.f.s. 6607
alkali elements, $(n + l)$ groups of terms 3527
Te, g values 3986
W I, h.f.s. 3988
Mg I, h.f.s. 3989
Pu, isotope shift 3990
Lyman-α-emission at 1216 Å, rocket observation 4567
Hα, self-reversal, h.p. spark disch. 4700
in lightning, λ6159–7157 Å 5255
Gd II, theory and expt. compared 4701
h.f.s. 5947
heavy elements, isotope shift effect 4702
high m. pt. metals, electrodeless lamp excit. 4753
N I, N II, in lightning, λ6159–7157 Å 5255
in long discharges in air 6600
Ca, Ge, Tl, Li, Volta luminescence study 5943
Pb, Volta luminescence study 5943
regularities in isotope effect 5949
Rb absorpt. series 2nd doublet broadening and shift 5956
N III, N IV, O II, O III, O IV, in long discharges in air 6600
C I and C II in alcohol-stabilized arc 6609
IN^{115} reson. lines, h.f.s. 6611
[N II], [Ne III], [O II], [O III], [S II] excitation calc. 7045
formulae for doublet separation 7557
Ru I, h.f.s., isotope shift 7559
Yb^{170}, isotopic shift 7560
Pr^{141} quadrupole moment 7829
complex, theory of 7844
Pd I, forbidden transitions 8313
Al II, anomalous h.f.s. 8314
Ni, ferromag. resonance absorpt. 8553
inorganic molecules see also *Molecules, internal mechanics*
H bond phenomena, quantum theory 5619–20
a molecular sum rule 6987
B″ quadrupole reson. freq. in BO_3''' ion 8620
inorganic molecules, diatomic
gaseous radicals, absorpt., in thermal equilib. 1526
atlas of characteristic wavelengths 3992
Miescher–Baer emission bands, far u.v. 3994
halogens, intensity distrib. in contin. spectrum 4697
visible bands, intensity rel. to press. 5395
gaseous alkali halides 6641
AlD, 2700 Å-system 4704
AlF, emission 4698
emission 4699
Schumann region 7564
AlH, 2700 Å system 4704
BaO, data for rotational constants 2332
BiH, data for rotational constants 2332
C_2 Swan bands, new transition probabilities 6410–11
CN, formed in discharge, absorpt. 4013
violet band intensities 6615
$C^{13}O^{16}$, electronic emission 1507
CO, intensity of vib. rot. bands 5958
i.r. absorpt. lines, press. effect 7577
CO$^+$, band, Baldet–Johnson system 6414
CSe, u.v., band emission 8317
CS, formed in discharge, absorpt. 4013
CaO, violet and u.v. region 7562
Cl_2^+, visible emission 6616
CoCl Π–$^5\Sigma$ transition 3108
DCl, fund. vib. rot. band 6639
i.r., 40–140 μ 7578
FeO, new i.r. band system 3993
u.v. absorpt. bands, possibly GeH 4001
GeO, Schumann region bands 4008
H_2, and mixtures, induced i.r. absorpt. 754
vac. u.v. intensities 1497
forbidden transitions, review 3112
emission near 4050 Å, elec. disch. 6415
fine structure 6610
HBr, i.r. intensity meas. 3999
i.r., 40–140 μ 7578
HBr$^+$, $^2\Sigma^+$–$^2\Pi$ band system 6614
HCl, i.r. intensity meas. 3999
i.r. band perturbation by N and A 6637
fund. vib. rot. band 6638
i.r., 40–140 μ 7578

Spectra—*contd.*
inorganic molecules, diatomic—*contd.*
He_2, emission near 4050 Å, elec. disch. 6415
near i.r. 6635
Hg_2 emission 1503
HgH bands, anomalous effective rotational temp. 12
HgI u.v. bands 3114
KBr, l.f. resonances 4257
LiF, irradiated, absorpt. bands and lines 6646
MnCl 3107
MnD, MnH, band systems 6613
N_2, ozonizer discharges 735
auroral after-glow mech. 1508
sunlit aurora, enhanced blue N_2^+ bands 2103
2nd pos. bands, ozonizer, irrad. effect 2331
3rd Rydberg series in far u.v. 2355
in A–N_2 high-voltage arc 4126
i.r. absorpt. due to intermolec. forces 5386, 6622
active, theories 5544
first positive bands 8316
$N^{14}N^{15}$, vibration 3995
N_2^+, far u.v. 4705
band anal., Schumann region, N^{15} use 6413
$^2\Pi$–$^2\Sigma$ bands anal. 8315
($C \rightarrow X$), far u.v. extension 8318
NH_2, formed in discharge, absorpt. 4013
N_2O, i.r. band 7581
NO, perturbation by A and N, up to 1000 atm. 73
absorpt., low temp. 740
u.v. absorption 3146
i.r. intensity meas. 3999
far u.v. 4705
vac. u.v. emission bands 5384
decomposition invest. 5742
band anal., Schumann region, N^{15} use 6413
NO$^+$, far u.v. 4705
band anal., Schumann region, N^{15} use 6413
l.f. resonances, NaF, NaCl, NaBr, NaI 4257
NiCl complex band spectrum 3109
O_2, new absorpt. bands, far u.v. 757
band-systems, intensities 1504
vac. u.v. absorpt. coeff. 1535
forbidden transitions review 3112
faint absorpt. bands, new forbidden transitions 4948
i.r. absorpt. due to intermolec. forces 5386, 6622
vac. u.v., absorpt. coeffs. 5963
Herzberg absorpt. bands, intensity distrib. 663
compressed, medium u.v. absorpt. 6640
O_2^+, band systems, intensities 1504
second neg. bands, intensities calc. 2593
OH, vibration-rotation bands analysis 121
rotation-vibration, intensity distrib. 738
and OD, in electrodeless disch., rotational intensity distrib. 3143
formed in discharge, absorpt. 4013
PbBr, u.v. region, absorpt. 3121
PbS, i.r. absorpt., rel. to temp. 3130
RaCl band system 3110
SH, formed in discharge, absorpt. 4013
and SD, by flash photolysis H_2S and D_2S 1527
SiO, Schumann region bands 4008
SrO, u.v. band system 1505
data for rotational constants 2332
blue bands 2335, 7561
radiowave
D_2 and H_2 in intermed. and strong fields 5655
Li^6F^{19}, molec. beam elec. reson. method 743
$N^{14}O^{16}$, magnetic h.f.s. appl. 1814
NaCl beam, dimerization 3490
O_2^{16} and $O^{16}O^{17}$ 4714
$O^{16}O^{17}$, magnetic h.f.s. appl. 1814
free OH radical 4022
ZnO, absorption due to lattice defects reorientation 749
inorganic molecules, polyatomic
gaseous radicals, absorpt., in thermal equilib. 1526
for 2 possible shapes correl. 1816
free radicals in irrad. photochem. systems 2345
transient molecules, chem. modulation method 576
Am chloride, hydrated, absorpt. 123
C_3 and 4050 band in comets 6419
C_3O_2, far i.r. absorpt. bands 4000

Spectra—*contd.*
inorganic molecules, polyatomic—*contd.*
CO_2, thermally excited, i.r. emission and absorpt. 122
i.r., 500°c 1531
vac. u.v. absorpt. coeff. 1535
$3\nu_3$ i.r. bands 2349
atm., i.r., absorpt. line width 5960
C^{13}/C^{12}, by i.r. absorpt. bands shift 7060
CS_2, long wave i.r. bands, with CsBr prism 2328
i.r., for calibration 2329
bands 3115
near 25 μ, band anal. 6636
CS_3, $3\nu_3$ i.r. bands 2349
ClO_2, i.r. 1530
Cu_2O, H-like absorpt. spectrum 1512
DCN, 2·5 μ to 0·5 μ 3141
D_2O, vibration-rotation 7575
HCN rotational const. velocity of light appl. 100
2·5 μ to 0·5 μ 3141
HDO, vibration-rotation 7576
H_2O, i.r., 500°c 1531
long-wave i.r. bands, with CsBr prism 2328
rotational lines in i.r. spectrum 2348
4·5–13 μ 2351
vapour, absorpt. in Schumann u.v. 4717, 6642
H_2S, 5150 cm^{-1} region 1012
absorpt., 8700 cm^{-1} to 11 000 cm^{-1} 3496
hydroxylamine, i.r. 2592
ND_3, emission 734
NF_3, i.r. 744
NH_3, emission 734
emission, low press. 4703
emission, compared with cometary spectrum 6416
new inversion lines 7572
i.r., 40–140 μ 7578
N_2O, 17 μ 2nd fundamental 133
absorpt., low temp. 740
i.r. absorpt., vibration 3138
N_2O_4, NO_2, absorption, 2400–5000 Å, separation 750
Nb oxide bands, rotational anal. 736
$Nd(BrO_3)_3.9H_2O$, u.v. to i.r. analysis 4004
NpO_2^+, visible and near i.r. interpretation 1011
O_3, and at 1110 cm^{-1} 4019
9·6 μ absorpt. band fine struct. 4568
PCl_3, far i.r. absorpt. bands 4000
PF_3, i.r. 136, 744
PF_5, i.r. 136
PH_3–*d* and –d_2, i.r. comparison with calc. 1004
POF_3 136
PuO_2^{++}, visible and near-i.r., interpretation 1011
SiH_3Cl, i.r. 5397
SiH_2Cl_2, i.r. 2343
$SiHCl_3$, SiH_2Cl_2, SiH_2Br_2, vibrational 6623
SO_2F_2, i.i. 745
radiowave
AsF_3 5396
ClF_3 4266
D_2O, 2 microwave absorpt. lines 134
rotational absorpt. lines 3133
GeH_3Br, survey 742
GeH_3Cl, survey 742
HCNS 8622
H_2O vapour, mm dispersion 2346
iodosilane 2347
ND_3, microwave absorpt. 3135
NH_3 collision broadening 6632
N_2O, 6 mm 741
O_3 5957
rotational transitions and analysis 5644
OCS, 6 mm 741
1 to 2 mm wave 4713
PH_2D and PHD_2 5645
SiD_3Cl 4716
SiD_3F 4715
SiH_3Br, SiH_3Cl, survey 742
TiO_2, V_2O_5, VO_2, U_3O_8, absorption due to lattice defects reorientation 749
inorganic liquids and solutions
KI–I_2, NaCl–KCl, NaCl–KBr, solns., i.r. water band shifts 69
O_3 anomaly, liq. and solid O, i.r. 1517
Am III, IV, VI and Eu III in perchloric acid 1522
NO_2^-, ClO_2^-, ClO^- in aq. soln., u.v. 2342

Spectra—*contd.*
inorganic liquids and solutions—*contd.*
I, in oxygenated solvents, absorpt. 3134
organic solutions, solvent band shifts 7570
uranyl and transuranium (V) and (VI) ions in soln., i.r. 3149
H_3O^+ ion in acid hydrates, i.r. 7566
inorganic solids
material ejected from plaster by ultraspeed pellets 116
i.r. absorption bands, water of crystallization 125
crystals, i.r., direction variation of frequency 129
freq. changes with orientation 4710
absorption, admixtures in dielectrics 747
crystals, Franck–Condon principle appl. 1247
rubies, continuous absorpt. 1514
Pr and Nd salts, absorpt., transitions 1516, 6625
quartz, cristobalite, silica, i.r., by reflection 1519
N_2O, solid, Schumann region 1520
didymium glass, i.r., for calibration 2329
rare earth salts, "extra" levels 2337
oriented rhombic S crystals, i.r., polarized radn. 2339
Cu_2O, absorpt., visible region 3127
visible and i.r. 5389
overtone electrons, absorpt. lines 5390
thermiated Ge, i.r. absorpt. 4007
u.v. absorpt., glasses containing Ti and heavy metals 4009
antiferromag. $CuCl_2.2H_2O$, radiowave 5385
absorption, KI(Tl) phosphors 5391
PbS layers, i.r. absorpt. 5393
NO film, absorpt., 2400 to 1600 Å 5394
microwave, lattice defects, review 5606
ionic crystals, H_2-like spectrum from overtones 5779
electron level temp. dependence, crystals 5952
crystall. hydroxides, i.r. absorpt. max. 6313
N_2O_5, i.r. absorpt. 6626
silicate-glass films, infrared transmission 6645
radiowave, ionic and electronic Debye absorpt. 6760
silica, gel, i.r. absorption 7563
H_3O^+ ion in acid hydrates, i.r. 7566
$CaSO_4$ anhydrate powder, i.r. absorpt. 7567
i.r. reflection, lead glasses 7604
diamonds, absorpt., reversible bleaching of band 8062
absorption bands of excess metal in salt films 8319
X-ray-coloured ammonium halides 8322
N_2O, Schumann region absorpt. 8323
alkali halide mixed crystals, *F*-band posn. 8776
V-bands posn. 8778
CaF_2, colour centres equiv. to alk. halide *F*-centres 8777
organic molecules and substances see also *Molecules, internal mechanics*
naphthalene bands at 3200–2900 Å, assignment 127
temp. dependence 4012
alkyl nitrites, u.v., rotational isomerism study 132
carotenoids, absorpt., theory 362*
benzonitrile, search for near u.v. absorpt. bands 746
benzene monocrystals, absorpt., polarized light 748
new electronic state 4946
2600 Å transition, excited state 6624
chlorobenzene, glow discharge 737
m-nitronitrosobenzene, absorpt., $n \to \pi$ transition 1515
1, 4 bis-(trifluoromethyl) benzene and 1, 3, 5 tris-(trifluoromethyl) benzene 1534
ethylbenzene and isopropylbenzene, liq. and solid, u.v. absorpt. 3126
ethane and deuteroethane, vibr. spectra 1006
dimethylacetylene 1007
methylacetylene and methylhaloidacetylenes 1008
O–H stretching frequencies in v. short H bands 1010
nitrocompound molecular complexes, emission 1506
H band study in trifluoro- and trichloracetic acids 1509
crystall. chlorophyll derivs., rel. to size 1513
assoc. dyes, Franck–Condon principle appl. 1523
3 isomeric picolines, near u.v. 1533
ferrocene absorpt., electron struct. interpret. 1818
azulene and other aromatics, alkyl shifts 1829
molecular complexes in soln. regularities 2341
simple alkyl amines, far u.v. 2354
N-methylpyrrole, undecomposed, emission 3111

Spectra—*contd.*
organic molecules and substances—*contd.*
biphenyl, hidden transition 3116
oriented dye molecule, polarization absorpt. 3117
acenes absorpt. calc., electron-gas model 3118
cresols, u.v. absorpt., liq. and solid 3124
o- and *p*-xylene, benzyl alcohol and chloride, u.v. absorpt. 3125
paraffin, methylene deform. freq. interact. 3128
C_2H_2, u.v. electronic transition intensities 3144
CH_4, u.v. electronic transition intensities 3145
$2\nu_3$ band fine struct. 7571
CF_4, u.v. electronic transition intensities 3145
cyclopropane, methylcyclopropane, vac. u.v. absorpt. 3147
cyanines, calc., metallic model appl. 3505
dyes, absorpt., calc., metallic model appl. 3506
complex unsat. molecules, semi-empirical theory 3508
aniline emission bands 3991
conjugated organic molecules, u.v., classification and assignments 4002
p-fluorobenzonitrile, near u.v. 4010
benzaldehyde blue bands 4011
toluene, continuous absorpt. in near u.v. 4021
p-chlorotoluene, u.v. absorpt. 4020
halogenated toluenes, u.v. absorpt. 4709
anthracene, polarized u.v. absorpt. 4711
transitions 8617
linear chains, vibr., intensity distrib. 5627
methaemoglobin and its fluorides, rhodamides, azamides and nitrites, absorpt. 5954
picrate ion absorpt. phenomenon 5955
free HCO radicals, absorpt. 5964
elec. disch. in vapours, emission near 4050 Å 6415
C_2H_x band struct., rel. to cometary emission 6417
emission, org. vapours excited by h.f. field 6598
ferrocene and ruthenocene 6618
amino triazines, u.v. absorpt. 6630
aromatic compounds, u.v. spectra (book) 7565
aliphatic terpenic alcohols, u.v. absorpt. 7569
reflection spectra of powders, diphenyl 8324
naphthalene, transitions 8617
NH valence freq. in pyrrhole and benzopyrrholes 8748
infra-red
protein and virus, dichroism study 126
alkyl nitrites, rotational isomerism study 132
methane ν_4 band intensity, and enhancement by N 135
Na formate, polarized 137
light and heavy trifluoroacetic acids 138
methyl chloroform 752
1, 1, 1-trichloroethane vibrational assignments 753
CF_3Br, CF_3I 755, 2350, 2591
CF_3OF 756
ethyl alcohol vapour 822
decaborane 1009
chloroacetyl chloride, bromoacetyl chloride and bromide 1016
absorption techniques in hypersensitivity diseases study 1318
methyl iodide, temp. and state influence 1510
1·6 μ band, meas. conditions 1529
character of chemical binding invest. 1511
naphthalene-d_8 in naphthalene 1518
deuterotrichlormethane 1521
dimethyldiacetylene 1525
hexafluoropropene 1532
$CHClBr_2$ and $CDClBr_2$ 1804
pyramidal molecules structure det. 1824
$CHCl_3$ long-wave bands with CsBr prism 2328
triClbenzene, polystyrene 2329
oxalylchloride 2340
dicyanoacetylene 2352
methylene halides, fine structure 2353
o- and *p*-quinones, CO stretching freq. study 2595
cis- and *trans*-diClethylene-*d*, vapour and liquid 3119
dibromodifluoromethane 3120
COOH and COOD bands in dimeric carboxylic acids 3123
coal and coal products 3129
tetranitromethane 3131
proteins in soln. 3132

Spectra—*contd.*
organic molecules and substances—*contd.*
infra-red—*contd.*
CD_3Br 3139
CH_3Br bands, high resolution 3140
CF_3CF_3, CF_3CF_2Cl, CF_3CFCl_2, CF_3CCl_3 3142
monodeuteromethane vibration-rotation band 349
CBr_2Cl_2, $CHBrCl_2$, $CHBr_3$, using CsI prism 3982
cis- and *trans*-dichloroethylene, *trans*- and *gauc* 1, 2 dichloroethane, propylene, acetaldehyd methyl alcohol, absorpt. bands 4000
methyl ammonium chloride, 3 solid phases 4006
1, 2 dichloroethane 4018
deuterosubstituted vinyl bromides 4708
aliphatic sat. hydrocarbons, interpretation 5387
benzene, near i.r., interpretation 5388
CHD_3 5398
CH_2BrCl 5635
cyclohexane disubstituted derivs. 5763
fluoroform, 2·2 to 20 μ 5959
CF_3CH_3, CF_3CH_2Cl, CF_3CHCl_2, CF_3CCl_3 5961
CCl_3CF_2Cl, CCl_3CFCl_2 5962
methyl linolenate, autoxidation initiation proces study 5965
dicyclohexyl 6619
CF_3D 6620
pyridine and pyridine-d_5, vibrational 6621
α- and β-hexabromcyclohexane 6627
methaemoglobinazide, absorpt., 2300 to 12 000 6628
alcohols, specific influence of solvents 6629
quinone carbonyl group and derivs. 6999
chloroacetone rotational isomerism data 7258
phenol, (OH) bands 7568
CH_4 compressed gas, absorpt. 7574
CH_3I, CD_3Br, CHF_3, $CHCl_3$ rotation-vibratio bands, fine struct. 7580
nylon, dichroic ratio for NH and CO bands 8752
radiowave
pyrrole, evidence for planar struct. 366
bromoform, structure det. 367
CH_3Cl 742, 4017
CH_3Br, survey 742
methyl amine, pure-rotational, prelim. anal. 751*
methyl alcohol and nitromethane 1524
vinylacetylene, microwave 1528
$C_8H_{13}Br$, $C_8H_{13}Cl$ 2336
methylene fluoride 3136
tertiary butyl fluoride 3137
molec. of point groups $D_{2d} \equiv V_d$ and T_d, absorpt. 3996
ethyleneimine 4015–16
liq. methyl palmitate and methyl stearate, reson absorpt. 4712
hexachlorobenzene, pure quadrupole 4951
formic acid 6633
fluorobenzene 6634
pyridine, molec. dimension data 7573
alkyl bromides and iodides, pure quadrupole 8321
Spectral line breadth see also *Doppler effect; Stark effect; Zeeman effect*
pressure effect, statist. theory 119
collision effect on Doppler width 2334
I vapour, 150°c 3106
H_γ, Stark broadening 4574
Ne, 5852·49 Å, discharge conditions effect 4696
combined Doppler and Lorentz broadening, absorpt. coeff. calc. 4706
equiv. widths, systematic errors 5950
quantum theory of broadening 5951
Rb absorpt. 2nd doublet, A and He press. broadening 5956
atm. CO_2, i.r., absorpt. line 5960
general theory, radiative corrections 6463
e^4 corrections 6464
press. broadening, rel. optical collision diameters deriv. 6612
NH_3 cm-wave, collision broadening 6632
intensity and width of i.r. absorpt. lines, press. var. 7577
Spectrochemical analysis see also *Chemical analysis, positive rays; Spectroscopy*
wavelength tables of sensitive lines (book) 1235
steel and cast iron, intensity, influence of elements 2802

A complete list of the Subject Headings will be found at the end of the Index.

Spectrochemical analysis—*contd.*
- Volta luminescence appl. 5943
- flame methods, review 7549–50
- d.c. circuit for spectral line intensity comparisons 8757
- **infra-red**
  - Ca carbonates and phosphates, absorpt. 7268

Spectrometers see also *Mass spectrometers; Monochromators; Spectrophotometers; Spectroscopy; X-ray spectrometers*
- fixed-focus, broad-range, echelle, high speed and resol. power 109
- photoelectric Raman apparatus 111
  - conversion of photog. instr. 2326
  - conversion of Perkin–Elmer i.r. to grating type 2327
- i.r., recent progress, review 730
  - calibration method 1492
  - high-speed 3100
  - for far infrared 4018
  - quartz, for absorbed water det., polymers 4694
  - developments, review 5953
  - double-beam 6604
  - continuous flushing with dry N 7552
  - fast-scanning, modification 8731
- 200-in. Hale telescope equip. 2145
- multislit, multipass 2325
- effect of slit width on line intensity 3099
- for rel. intensities, alternating light method 3976
- double-beam, optical design 3978
- diffraction grating, construction 3981
  - astigmatic error compensation 6602
  - registering, use near 25 μ 6636
  - concave-grating, kinematically focused 7551
- resolving power of prism not at min. dev. 5376
- photoelec., with double beam and high resolution 5381
- auroral, rapid-scanning 6603
- ratio-recording, with double-pass monochromator 7553
- Raman, relative speeds 7554
- **accessories**
  - interference wedge use for projection 108
  - slit mechanism for i.r. spectrometers 114
  - for i.r. spectrometry, review 730
  - i.r. microspectroscopy, liquids, capillary cell 1493
  - Pfund type absorption cell 1531
  - adjustable slit for vac. spectrograph 3098
  - i.r. double-beam recording, optical system and thermopile amplifier 3101
  - variable-thickness cell for liquids 3977
  - photocells and filters for filter spectroscopy 3980
  - grating efficiency, vac. u.v., improvement by platinizing 4695
  - reflection spectra automatic recording app. 5944
  - dual beam heated i.r. cell 5945
  - fast spectrographic camera design 5946
  - PbSe cells in i.r. spectroscopy 6605
  - app. for low temp. u.v. spectra, solutions 6606
  - semi-automatic wavelength data recorder 7413

pectrometers, microwave
- recent developments 124
- broad-band coaxial Stark cell 728
- app. for Zeeman effect meas. 729
- circuit for detector amplitude stabilization 8585
- nuclear resonance spectrometer 5658
- mm-wave, design and perform. 8320

pectrophotometers see also *Colorimeters*
- modified, appl. for microspectrometry, microdensitometry, continuous flame photometry 110
- single detector, split-beam, automatic recording 2322
- modified Beckman DU, liq. fluoresc. spectra meas. 4724
- portable, wedge, for colour and brightness temps. 6582
- i.r. double-beam recording 8312

pectrophotometry see also *Colorimetry*
- micro-, Schwarzchild–Villiger effect 113
- dye control with *R*-Cam and ruler 169, 3196
- flame photometry, impurities effect 727
- intensity meas., vac. u.v. 1497
- ultramicro-, photometer and absorption cell attachment 2321

Spectrophotometry—*contd.*
- vac. u.v. meas., using photomultipliers 3102
- C arc as radn. standard, 0·25 to 1·8 μ 4693
- of flames, review 5941
- two rare-earth metal mixture anal. 5942
- equiv. line widths det., systematic errors 5950
- spectrophotometric colorimetry error propagation 5988
- slit source, construction 5991
- of comets, colloquium 6392
- of periodic comet, Schaumasse 6395
- photographic, far u.v. 7555

Spectroscopy see also *Spectra; Spectrometers; Spectrophotometry*
- micro-, modified spectrophotometer appl. 110
- microwave, techniques and ultimate sensitivity 124
  - nuclear moments det. 1840
  - large digital computers appl. 3997
  - in atomic and nuclear invest., review 4707
  - solids struct., lattice defects, review 5606
- concave grating with successive diffractions 165
- i.r. solar, in high-altitude aircraft 559
- i.r., recent progress, review 730
- oil industry applications 1320
- industrial spectroscopy colloquium 1488
- plane grating arranged for double-pass 1491
- i.r. spectrometers calibration 1492
- i.r. microspectroscopy, liquids, capillary cell 1493
- Doppler effect and resolving powers 1494
- i.r., in chemical binding study 1511
- i.r. absorpt. in vibr.-rotation spectra, band intensities meas. 1529
- crystall. powders absorpt., by diffuse reflectance 1536
- Debye absorption study of lattice defects 1623
- ZnO struct. defects study, method 1640
- low temp., in further u.v. 2320
- wavelength meas. in echelle spectra 2323
- with CsBr infrared prisms 2328
- calibrating wavelengths, 0·6–2·6 μ 2329
- arcs, temp. meas. 2471
- time-resolved, of ultraspeed pellet luminosity 3095
- Cs discharges in mag. field, study 3097
- absorption, double-beam systems 3101
- Hg λ2537 line h.f.s., Fabry–Perot etalon study 3105
- absorpt. bands, i.r., absolute meas. 3140
- i.r. absorpt. study of solid state reactions 3679
- rockets appl., solar spectra 3815
- resolution of two unequal intensity lines 3974
- filter, photocells and filters, spectral props. 3980
- i.r., with CsI prism 3982
- near i.r. interferometric wavelength meas. 3983
- high-resolution, i.r., double-pass method 3984
- abs. f values from rel. intensity measurements 3987
- nomogram for Doppler contour line intensities 4680
  - for Lorentz contour line intensities 4681
- dispersion of standard air 4690
- C flame method, pure band spectra appl. 4692
- absorpt. coeff. calc. for combined Doppler and Lorentz broadening 4706
- 1 to 2 mm wave, equipment 4713
- Raman apparatus for gases 4730
- radiowave, review 5385
- flame, review 7549–50
- i.r., apparatus developments, review 5953
- long discharges in air 6600
- use of minimum light criterion 6601
- vac. tube molec. i.r. emission 6824
- "magnetic scanning" method for h.f.s. and isotope shift 7558
- u.v. photoelectric, absorpt., "false energies" 7569
- communication theory appl., line widths 8310
  - information in spectrum 8311
- reflection, of powders 8324
- spectrographic unit for N.P.L. gauge interferometer 8344
- fast-scanning i.r. spectrometer, gas-phase kinetic studies appl. 8731
  - NO–N_2O, reaction 8732
  - NO_2–C_2H_5OH reaction 8733
- **light sources**
  - i.r., water-cooled C arc 107
  - arcs, self-absorption 131
  - Raman spectroscopy source unit 791

Spectroscopy—*contd.*
 light sources—*contd.*
  industrial spectroscopy colloquium 1488
  rel. to lightwave length standard 2970–1
  capillary arc and pulsed discharge, vac. u.v. appl. 3102
  C arc, spectrophotometric radn. standard 4693
  flash-disch. tube for Lyman continuum 4752
  electrodeless metal halide lamps 4753
  d.c. arc, spectrograph. anal., automatic ignition 4754
  emitting continuous spectrum 5382
  powerful, windowless, for far u.v. 5432
  slit source for spectrophotometric measurements 5991
  spark, electronically controlled 6599
  carbon arc as i.r. source 6689
  low-voltage spark generator 7556
Speech
  perception process 706
  language redundancy, control tower evidence 707
  analysis, phonemics and allophones compared 708
  phonemic elements identification, phonetic basis 709*
  operational phonemics, rel. to linguistic relativity 710
  information-bearing elements 711
  analysis, auditory theory, a phase-principle appl. 712
  synthetic, perception 713*
  intelligibility in room, geometric factor importance 720
  dynamic spectrograms 1471
  voice control, communication systems 1472
  automatic spoken digits recognizer 1473
  mech. imitation of voice 2288
  human voice in electrical models 2298
  consonant environment influence on vowels 2299
  auditory tests with synthetic vowels 2300
  human voice, factors controlling 5353
  long-time average, analysis 5354
  electric analogue of vocal tract 5934
  study with microphone-controlled stroboscope 5935
  influence of returning sound on localization, etc. 5936
  band width of vowel formants 6574
  human and synthetic, comparison 8297
Spin see *Fundamental particles; Nucleus, spin; Rotating bodies*
Spin-lattice coupling
  relaxation in ferromagnets 1739–40, 8537–8
  neutron scatt. by coupled paramag. ions 2745
  Cd^{111} elec. quadrupole interact. with crystall. field 5032
  2nd-order quadrupole effects, single crystals 6947
  3 solid benzenes 6985
  paramagnetic resonance, review 8566
  nuclear magnetic relaxation, crystalline solids 8771
Spinels
  Fe$_5$CuO$_8$, struct. and magnetic props. 2541
  Zn–Fe spinel, radioactive Fe diffusion 4403
  LiFeCr, spontaneous magnetization reversal temp. rel. 4908
   anomalous *g* factor temp. rel. 4909
  neutron bombard. effect on susceptibility 6956
Spinors see *Quantum theory, spinors*
Sprays see also *Aerosols; Drops; Jets*
  water, protection against heat radiation 1575
  drop size and distrib. calc. 6524
  hypodermic needles, uniform drop size 6525
  electrostatic atomization of liquids 8262
Standards see also *Length standards; Mass standards*
  absolute freq., annual fluct. revision 14
  sound transmission meas. methods, buildings 92
  testing gas-filled counter tubes 276
  gas-filled radiation counters, terms 916
  British standard of I^{131} 1045
  present status of temp. scales 1588
  maintenance, symposium 2972
  angle, calibration by interferometry 2976
  time, frequency and velocity meas. 2981
  vel. of light, precision of optical methods 3078
  photometric scale establishment, N.P.L. 3080
  photometric units co-ordination 3081
  C.I.E. light sources, *A*, *B* and *C*, spectral energy distrib. 3197
  Internat. Temp. Scale, extension below 0 point 3264
   realization, −182·97°C to 630·5°C 3265

Standards—*contd.*
  radioactive isotopes, coincidence and γ-ray ionization 3540
  radioactive, maintenance with 4π proportion counter 3539
  primary, of luminous intensity 3963
  white light source for colorimetry 3964
  C arc as spectrophotometric radn. standard 4693
  graphical square intercomparison method, accurac calc. 5830
  Au–Cr resistance standards 6769
  microwave freq. standard 8584
Star models see *Stellar structure*
Stark effect
  Stark splitting, 2D$_2$O microwave absorpt. lines 134
  broad-band, coaxial cell for microwave spectroscop 728
  rotational line strength calc., asymmetric roto 1002*
  molec. elec. dipole moments det. 2603
  asymmetric rotator with h.f.s. theory 3104
  heavy water 3133
  in stellar spectra, theory 4573
   Hγ broadening 4574
  Cu alum, paramag. res. spectrum 8557
Stars see also *Nebulae; Novae; Stellar clusters, motion structure; Variable stars*
  relaxation time in fluctuating density field 2159*
  visibility during twilight 2915
  classification, by spectra and luminosity 2916
  white dwarf, rotating, limiting mass 3828
   internal temp. 3835
  magneto-hydrodynamic oscillations 3829
  origin theory 5270
  giant and dwarf, separation by 3-colour photometr 5843
  rate of accretion of isothermal gas 8198
  evolution, extensive review 7385*
 magnetism see also *Sun*
  α^2 Canum Venaticorum, variable field 2158
  magnetic fields origin, moving plasma theory 3324
  primeval stellar field, decay 3831
 magnitudes
  diameters from diffraction at occultations 5841
  Coma Berenices cluster photoelec. 5842
  photomultiplier measurements 6430
 radiation see also *Astronomical spectra; Cosmi radiations, r.f.; Stellar structure; Sun*
  spectrophotometric measures, white dwarfs appl. 1
  colour temperature observations 1344
  propagation theory 3451
  max. in luminosity function 5283
  simult. obs. of radio scintillations on 2 frequencie 7392
Statistical analysis see also *Errors; Probability; Random processes*
  correlation fn. computer 5
  stochastic processes depending on a continuou parameter 4556
  parameters of experimental law 7378–9
 applications
  macromolecules, long random coil problems, random flights appl. 370
   excluded vol. effect in polymer chains 1830
   stiff chains, light scattering appl. 2799
  servomechanisms theory 578
  Heisenberg's uncertainty rel. as stochastic dependence 635
  noise research problems 714
   pulsed carriers, detect. 3794
   capacity in a noisy channel 8182
  nuclear emulsions, star distrib. 1734
   particle track analysis 8164
  Barkhausen effect study 1760–2
  metals fracture, stochastic theory 1952
   ductility transition to brittleness 1953
   fatigue tests, interpretation 4425
   fatigue fracture 4428
  glass, rupture resistance, temp. effect study 1987*
  information theory 2143
  liq. spray and dust electrification 2433
  3-dimens. ferromagnet. approximation methods 2535

Statistical analysis—*contd.*
 applications—*contd.*
  crystal struct. det. 2819
   superlattice reflections 2820
   errors in pseudocentrosymm. crystal struct. 8038
   naphthalene struct. det. 8090
  sampling theory 2901
  delay in telecomm. systems 3793
  stochastic processes theory, optics appl. 3961
  communication theory, optics appl. 3962
   spectroscopy application 8310–11
  fusion and condensation theory 4055
  unstable particle mean life-times 4385
  in meteorology, handbook 4495
  water-vapour absorpt., atmosphere 4510
  associated measurements (book) 4579
  physical data, trend analysis 5268
  statistical theory of magnetron 5543
  information theory survey 6495
  equivalence of optimum transducers 6563
  Raman polarization data 6659
  pos. meson scatt., phase shift anal. 7168
  "best" straight line among the points 7380
  rotational phase transition 7812
  Fourier series maxima location 8089
 counters
  dead time for periodic irradiation 3373
  counts only slightly above background 4169
  generating functions theory, scintillation counter fluctuations 5538
  cosmic-ray counting-rate meter 6913
  review, bibliography 7744
  stochastic problem rel. to 8181
Statistical mechanics
  information in quantum measurements 57
  spectroscopy, pressure effect on spectral lines 119
   diatomic interhalogens, thermodynam. props. calc. 201
  interacting particles assemblies, quantum mechanics 202
  2-dimensional Ising lattices 315
   partition function 2811
  particle nos. fluct. charac. in Coulomb interaction system 634
  solutions, strong electrolyte 654–5
   particle space requirements in electrolytes 2244
   r-mer solutions 3917
   alkali metal in liq. ammonia, Fermi statistics appl. 7503*
  electron gas magnetic props. and number theory 949–50
  ferromagnetism, quantum statistical treatment 951
  cooperative phenomena in crystals, simplification 952*
  of irreversible processes 1399, 6492–3
  virial theorem in Thomas–Fermi–Dirac systems 1439
  colloidal particles, interaction force 2026
   double layer, charging process 5161–2
  crystal surfaces, partition of nos. theory appl. 2049
  degenerate electron gas, thermodynam. potl., temp. var. 2211
  liquid state, "lattice model" appl. 2238
   Lennard–Jones Devonshire theory modification 3003
  of phase transitions 2427, 3240
  nucleus statistical theory 2605–6, 7028
  series of statistics with state occupied by $\ngtr n$ particles 2962
  relativistic statistical thermodynamics 2964
  cluster variation method 2965
  cell model of solns., mixing non-randomness 3010
   binary solution 3011
   statistical thermodynamics 3918
  critical soln. phenomena statist. thermodynam. appl. 3012
  Boltzmann's H-theorem appl. 3278
  of polymer adsorption 3697
  graphite spec. heat, v. low temp. 3716
  isotherms of an imperfect gas 4069
  particle ensemble statist. density 4598
  systems with arbitrary no. of integrals 4623
  Boltzmann equation in quantum mech. 4658
Statistical mechanics—*contd.*
  real gases (book) 5147
  saturation and condensation statistics 5306
  excitation spectra theory, macroscopic systems 5307
  spectra of systems of interacting particles 5309
  Bose and Fermi statistics, distrib. functions deriv. 5868
  Thomas–Fermi–Dirac functions and eq. of state 5869
  of surface tension 5890
  He^3, He^4 mixt., sat. vap. press. cluster theory 6008
  dielectric constants, polar substances, theory 6030
   polar liquids, theory 7655
  statist. thermodynam. of rubber elasticity 6262
  relativistic eq. for reacting fermions 6459
  correspondence with wave mechanics 6489
  random flight problem in k-dim. space 6490
  microcanonical to canonical total by δ function 6491
  generalized, and the Onsager relations 6494
  theory of freq. changes with temp. and vol., solids 6979
  equipartition principle of generalized canonical ensembles 7377
  particle theory, connection between spin and statistics 7445
  second quantization application 7470, 8220–1
  statistic. dynam., continuous media, correl. method appl. 7471
  type of statistics, effect on Maxwell's demon 7472
  of interacting dipoles 7473
  statist. theory of linear dissipative systems 8243
  pair distrib. function for 1-dimensional gas 8244
  semiconductor calculations 8400–1
  nucleons in nucleus 8634
   angular momentum distrib. 2607
Stearic acid
  monolayer, prevention of water evaporation 2795
  crystals, growth and optical props. 4469, 7283
  association in liquid and crystal growth step height 7282
Steel
  analysis by X-ray fluorescence, problems 528
  elast. modulus, fatigue phenomena influence 1188
  C estimation, using artificial radioactivity 1234
  u.s. waves velocity 1448
  annealed, work hardening, static and dynamic conditions 1990
  electrolytic polishing, surface-roughness study 1162
  B steels, B detect., autoradiographic tech. 2129
  jet formation in high-vel. collisions 2994
  plates, transmission of sound 3044
  carbon steel coercive force, Neel's theory 3429
  septum permeation by H from flame 3635
  H and D permeation during corrosion 5122
  high-speed, Hall–Kikoin effect 5601
  retained austenite transformation by fracture 5730
  dissolution in H$_2$SO$_4$, u.s. influence 5766
  phase transformations, X-ray invest. 7978
  Si–Fe domain pattern under stress 8604
Stellar clusters
  globular, density det. 1350
  formation, stellar gas gravitational condensation 5281
  Coma Berenices, colour-luminosity diagram 5842
Stellar composition see also *Elements, origin*
  theory, "homologous" rule 5844
  abundances of elements, conf. rep. 6437
  absorpt. lines, stellar atmospheres 7405
Stellar constitution see *Stellar composition*
Stellar motion
  spectroscopic binaries, period-density law 1348
  through fluctuating density field, relax. time 2159*
  origin of magnetic fields 3324
  velocities, variation with longitude 6431
  stars nearer than 20 parsecs, max. freq. in distrib. 6432
Stellar structure see also *Cosmogony; Sun*
  white dwarfs, radii from spectrophotom. meas. 11
   rotating limiting mass 3828
   internal temp. 3835
  proton-proton chain reactions in stars 588
   rate 4577
  colour temp. observations 1344

A complete list of the Subject Headings will be found at the end of the Index.

Stellar structure—*contd.*
- Schmidt mirror colour index det., differential method 1345
- Pleiades and Praesepe, short-wave colour brightness diagram 1346
- spectroscopic struct., period-density law 1348
- Schwarzschild's integral eq., general soln. 1349
  - appl. to cluster density det. 1350
- rotating mass of gas, temporal evolution 1351
- relaxation time in fluct. density field 2159*
- atmospheric compression waves, radn. press. 2160
- adiabatic pulsations of variable star 2917
- neutrino energy, supernovae 3818
- stellar atm., extended radiation field 3826
  - thin atm. equilib. round central core 3827
  - line-width correl. and Doppler velocities 3834
  - H and He, radiative and adiabatic zones connection 4576
  - adiabatic gradient, calc. for H and H–He stars 7407
  - outer, of some Be stars 8197
- magneto-hydrodynam. oscillations of a star 3829
- emergent intensities formulae, Laplace transformation appl. 3830
- inhomog. models, chem. comp. discontinuity 3832
  - gravitationally contracting core 3833
- gravitationally contracting model 3836
- radiative transfer problems, variational methods 3837–9
  - emitting atmosphere 3840
- dynamics of stellar systems 4572
- high mass conc. and pulsation 4575
- condition of flux continuity 5284
- gravity-flux diagram study 5285
- vibr. stability, thermonuclear reaction sensitivity appl. 6438
- He atom unstable levels population eval. 7403
- radiation pressure and stability of early type stars 7406
- convective core at centre 7408
- evolution, review 7385
- radiation by isolated spherical star, theory 8204

Stereoscopy
- grid X-ray stereoscope 2877
- stereoscopic cameras for cloud chamber 7371
- stereoptometer, for study of binocular space perception 8148

Stopping power see *Range of particles*

Storms see *Atmospheric disturbances; Magnetic storms; Thunderstorms; Weather forecasting*

Strain gauges
- X-ray spectrometer method, evaluation 1981
- wire, steel bar stress wave study 3933
- elec. resist., components and construct. 6500

Strength see *Electric strength; Mechanical strength*

Stress analysis see also *Bending; Photoelasticity; Strain gauges; Torsion*
- distrib. in deep beam with 2 holes 2969
- routine analytic method 3888
- isochromatic lines in transparent models 7616
- **plates**
  - circular plates theory, Bessel functions 6497

Stress measurement see *Dynamometers; Strain gauges*

Stress/strain relations see also *Elastic constants*
- effect of deformation bands 3652
- machine for true strain rate in tensile testing 3666
- gen. classical medium deformed isothermally 5140
- Portevin–Le Chatelier effect in Al 7992

Stresses, internal
- small distortions in crystals, X-ray diffract. effect, etc., 535
- thermal, in partially damped half-plane 1400
- rel. to domain size 1761
- in high power solenoids 3442
- dislocation loops interaction, magnetic analogue 3649
- residual, in moulded plastics 3650
- due to disorder, vitreous matls. 4420
- stress waves in solids (book) 4421
- thermo-elastic stresses det., tube 5994
- torsional, in notched shaft, distrib. 6498
- X-ray diffraction meas. method 7202
- energy stored in work-hardened material, calc. 7214
- in cold reduction mill reels 7994
- domain pattern, Si–Fe under stress 8604

Stresses, internal—*contd.*
- glass, strain release rel. to free interfacial energy 87
- energy release in deformed Ni 8722
- residual strains in plastically deformed Fe 8723

Stroboscopes
- microphone-controlled, in lip movements study 59
- l.f., double-flash, construction 6691
- freq. modulation extent. estimation, appl. 7535
- time lag observation in Joshi effect, appl. 7700

Strontium
- Sr^{86}/Sr^{88} variations in mineral sources 2630
- azide, ionic conductance meas. 8015

Strontium fluoride
- single crystal, i.r. transmission limits 3148

Strontium sulphate
- X-ray induced absorpt. bands, enhancement 1538

Strontium titanate
- heat capacity and entropy 3267
- elec. conductivity 6771
- dielec. props. rel. to temp. and freq. 8389
- Ba/Sr titanate permittivity, 3000 Mc/s region 8390

Sublimation see *Heat of sublimation; Vaporization*

Sulphur
- opt. and elec. charac. (book) 234
- vapour, dissociation 1206
- optical absorpt., vapour, liq. and soln. 2356
- thermodynamics, properties 3276
- purple, preliminary magnetic study 3433
- liquid, diffusion invest. 7496
  - press. effect on diffusion 7497

Sulphur dioxide
- thermodynamic properties (and SO, SO_3) 3276
- thermal conductivity, 0–50°c 4760
- spec. heat ratio, resonance method 4774
- gas, u.s. vel. and absorpt. 7527

Sulphur hexafluoride
- SF_6, neg. ion formation 1708

Sun see also *Corona; Prominences; Sunspots*
- model solar atmospheres 2150
- energy production, *p–p* cycle appl. 2691
- revised model interior 3806
- photosphere turbulence spectrum 3808
- gravitationally contracting model 3836
- atm., D abundance 4564
- centre-to-limb darkening, 6000 Å to 23 000 Å 5277
- investigation of photospheric granules 5278
- surface temp. det. from V line intensities 6429*
- kinetic temperature of chromosphere 7401
- asymmetry of disk from r.f. observations 8188–9
- atm., thermal activity, thermal field instabili interpret. 8192
- **magnetism**
  - field vertical gradient in spot zone 2910
  - fields, mapping method 3804
  - field decay time 3831
  - field strength, distrib., normal sunspots 5837–8
  - measurement, possibility of 6420
  - fields, photoelec. meas. 8187
  - deflection of cosmic rays 8500
- **radiation** see also *Astronomical spectra; Sunlight*
  - "enhanced radiation," plasma oscillation origin 583
  - ionizing radn. distrib., eclipse meas. 584
  - atm. elec. unaffected by eclipse 1292
  - cosmic rays, origin of daily meson var. 4190
  - cosmic rays, continuous emission, world-wid effects 4192
    - energy and composition var. 7764
  - limb-darkening rel. to source function 4561
  - invest. by aircraft-launched rockets 6328
  - review of 4½ yrs obs. 6421
  - corpuscular streams, rel. to *F* layer diurnal var. 881
  - **radiofrequency**
    - high-intensity components, thermal theories 2909
    - noise from coronal prominences 3803
    - outbursts, charac., rel. to solar matl. density an motion 3805
      - association with high-velocity ejection 3809
    - from sunspots, directivity analysis 3807, 7398
      - at 160 Mc/s (1948–51) 7399
    - used to formulate theory of corona 5279
    - brightness distrib. over disk, meas. 6422
      - at 9350 Mc/s 8190
    - 10·7 cm limb darkening 6423

un—*contd.*
radiation—*contd.*
radiofrequency—*contd.*
high resolution aerial 7382
quiet, long-period variation 7397
eclipse observations on 169 and 9350 Mc/s, asymmetry 8188–9
from electron collisions in ionized gas 8478
unlight see also *Sky brightness*
u.v. energy at 11 000 ft 3773
polarization in sky of pure air molec. 3777
solar constant value 5241
4½ yrs meas. 6421
reflection and diffraction from ice crystals 5811
u.v., temp. rise from absorption by O_3 8127
unspots
new photometric observations 585
luminous granulations, av. life 586
fresh groups, rel. to filament dissolution 1342
physical conditions deduced from spectrum 2149, 2910
mag. fields, mapping 3804
field strength normal distrib. 5837–8
radio emission, directivity analysis 3807, 7398
at 160 Mc/s (1948–51) 7399
number series analysis 4562
investigations of granules 5278
solar activity, rel. to cometary phenomena, colloquium 6392
rel. to comet tail physical processes 6406
cometary brightness rel. to solar activity 6396
radiation flux distrib. 6424
control of geomagnetic activity 6425
warming of stratosphere by solar eruptions 7357
80 yr. cycle and aurora 7400
distribution, rel. to geomagnetic disturbance 8191
uperconductivity
supercond. metals theoretical and experimental heat capacities 198
sound waves emission from electron in a metal 235
Ta, field emission, normal and supercond. state 236
superconductive transition 241
contacts between electrodes, TiO_2 or CeO_2 covered 4813
Cd, size effects 237
below 1°K, thermo-magnetic considerations 239
cylindrical, free energies and phase transition 242
Re 240
Pb, spec. heat, 1°K to 75°K 815
heat conductivity below 1°K 1647
nature of transition 6802
La, transition temps. mean 840
In–Tl, solid solns. 863
films 7684
Zr, Hf, Cd, Ti, props. below 1°K 864
Sn, thermal resist. rel. to mag. field (and In and Sn/Bi) 865
transition region meas. 1646
below 1°K, thermal conductivity 3317
and Tl, films, low temp. deposited 5476
surface resist. at 9400 Mc/s 5477
thin films, meas. 7685
destruction by large currents 1645
Hg, transition region meas. 1646
thermal resistivity in intermed. state 6062, 8426
2nd sound propag., conditions calc. 2420
Coulomb interaction and Meissner–Ochsenfeld effect 2464
two-fluid model 2465
similarity properties 238
in magnetic fields, forces acting 2466
Co disilicide props. 2467
NbN, anomalous critical current effect 2468
Bardeen's theory, electron gas considerations 2551
phenomenological theory correction 3314
some props. below 1°K 3315
silicides and germanides 3316
mag. field rel. to current 4106
metal carbides, borides, nitrides, hydride, powders, invest. 4107
thermal conductivity 4758
of disturbance-centre semiconductors (PbS) 4814
supercond. films in mag. field 5474
second group, size influence on critical field 5475
Superconductivity—*contd.*
Bi film, rel. to colour change 5478
structure in intermediate state, probe invest. 5479
Bi–Pd alloys 5481
dielec. const. and normal conductivity det. 5483
theory, modification for anisotropy 5480
of compounds of non-supercond. elements 5482
configuration, thermodynamics 6025
Bi alloys with Rb and Cs 6058
energy-momentum tensor in phenomenological theory 6059
special switching-on and release processes 6060
do all metals become superconducting? 6061
temp., current, mag. field phase diagram 6794
paramagnetic effect 6795
textbook 6801
noise meas. in superconductor 6803
transition rel. to freq., quantum theory 6804
low temp. diamagnetism of electrons in cylinder 6805
propagation velocity of phase transition 6806
heat conductivity of Sn, In, Tl, Ta, Cb, and Al below 1°K 7688
Rh_3Ge_2, $\alpha PdBi_2$, PdBi 7686
thermal cond. in intermed. state, calc. 7687
low temp. physics textbook 8366
electron-lattice interaction, model 8607
Supercooling
supercooled polar liquid, viscosity theory 2240
of liquids, theory 2241
supercooled liq. props., discontinuities 2242
water, spontaneous nucleation theory 2243
drops of molecular liquids 3013
water, in glass, freezing expt. 3236
equilib. in glasses, irreversible approach 4401
water drops, influence of drop volume 4763
H_2O and D_2O, properties 5319
Superfluidity
He II, film, transport over Cu, below 1°K 191
liq., transport phenomena, narrow slits 2416
irreversible processes appl. 2418
non-viscous fluid hydrodynamics and He II theory 3255, 8375
hydrodynamics invest. 3256
film formation study 4060
film, opt. method 4061
film transport over various materials 5442
solutions of extraneous particles in 5443
film transfer rate near zero level difference 6010
flow through compressed powder 6727
fountain effect in He II below 1°K 6728
heat transfer through fine slit 7637
rotating-cylinder viscometer expts., liq. He II 8374
adsorbed He on silica gel 805
film flow in He cryostats below λ-point 1587
He I viscosity, press. influence 2417
He^3–He^4 mixtures, macroscopic theory 4059*
unsaturated He film, review 5440
film transport, variation with film height 5441
Supersonic flow see also *Shock waves*
shear, two-dimensional, telegraph eq. soln. appl. 3
supersonic projectile flow pattern 661
supersonic tuyères for blowers 662
wave eq. in hyperbolic space 1413
solution using Laplace transformation 1434
nozzle, hodograph eq. transformation 3024
over insulated wedge, viscosity effect 3025
over flat plate, temp. distrib. meas. 3026
anomalous dispersion, molecular collision invest. 3029
cross Mach line in simple waves 3931
boundary layers and upstream influence 4657
from Hg vapour jet, high vac. 5900
plane gas jet 5902
non-existence of limiting lines 6545
boundary layers and upstream influence 6546
inviscid jet past infinite wedge 7509
supersonic bang, theory 7510
Supersonics see *Ultrasonics*
Surface energy
boundary energies rel. to contact angles, low-energy solid 63
free-energy of solid paraffin wax 1415
spreading of liquid metals on solid surfaces 6526

A complete list of the Subject Headings will be found at the end of the Index.

Surface ionization see *Ionization, surface*
Surface measurement
  powder, by ion exch. method 4629
  calc. from moisture content, suction pressure meas. 8247
Surface tension see also *Capillarity*
  rate of shear effect on miscibility 653
  liq. F, rel to temp. 1404
  d.c. field influence on adhesion tension 1414
  gradients, and bubble film stability 1418
  spherical surface, expression for 3897
  Hg, conditions for "wetting" glass 3913
  meas. by bubble length method 3915*
  rel. to time, alcohol aq. solns. 4115
  UF_6, 65°–100° 4634
  phys. chem. textbook 5148
  Sn, Bi, Ag, Au, Cu, Ni, Fe, at m. pts. 5323
  interfacial, between liq. non-miscible metals 5329
  molten metallic mixtures, temp. coeff. 5889
  statistical mechanics of 5890
  ethylene glycols, temp. dependence 5891
  of a cloud drop 5892
  elec. field action on spreading drops 6520
  rel. to covalent radii 6521
  interfacial, liquid–liquid, tables for 6522
  liq. Si and Ge 7490
  liq. spreading on hydrocarbon surfaces 7491
  iron–carbon alloys 8260
  electrostatic atomization of liquids 8262
  He II, anomalous 8368
  sodium dodecyl sulphate 8745
Surface tension measurement
  sessile drop method, Hg appl. 3914
  substances at their m. pts, drop method 5323
Surface texture
  in deformed metals, and plasticity theory 490
  roughness, retardation of shock waves 680
  steel surface roughness meas. 1162
  Fe–Si single crystals, rel. to polishing 1165
  effect on incipient condensation 1417
  surface polish, interferometric study 1559
  polished surfaces, electron diffract. patterns 1976
  polished diamond, interferometric exam. 2384
  explosive driven metal plates, photog. study 2749
  metals, new replica method for elec. microscopy 2760
  machined metals, multiple beam interference invest. 3215
  glass, polished phase contrast exam. 3216
    no surface flow in polishing 7194
  optical, polishing defects, phase contrast study 3217
  reflection electron microscope exam. 3351
  interferometer microscope for opaque objects 4047
  effect on contact resistance 4100
  metals, symposium 4400
  quartz, ground and etched, X-ray exam. 4410
  scanning electron microscope exam. 5138
  by electron-emission microscopy 6841
  roughening and oxidation, heated galena 7193
  X-ray reflection study 7977
  mechanism of electropolishing 8017
Suspensions see also *Aerosols; Sedimentation; Sols*
  due to u.s. waves, corrosion products 87
    Dow latex 580G, resuspension 2029
    particle movement 8267
  elastic spheres, Brownian deformation 652
  light absorpt. and scatt., rel. to wavelength 761
  device for counting suspended particles 1402
  ultrasonic velocity temp. dependence 2264
  clay in water, X-ray diffract. size det. 2793
  viscosity rel. to vol. conc. 3693
  rod-shaped particles, size det. by flow birefringence 4748
  sound propagation 5912
    closely packed 674
    heavy, scattering of sound 1465
    water fog in air, sound absorption 5344
  membrane-covered ellipsoids, elec. permittivity 6752
  elastic and viscous properties 7255
  polydisperse rods, scattering factors 7615
  particle size, theories of measurements 8628–9
Swelling
  Buna-N rubber, u.s. study 2263
Synchrotrons see *Particle accelerators*
Tables, mathematical
  binomial probability distrib. to 6 places 4
  for compressible air flow calc. (book) 659
  hexadecimal conversion tables 2896
  applicable in transfer problems (book) 2923
  Chebyshev polynomials $S_n(x)$ and $C_n(x)$ 3785
  on punched cards, list 3787
  for compressible flow calc. (book) 3927
  functions occurring in radiowave diffraction b earth 4932
  high-order hypergeometric functions for gas-flo theory 4654
  functions involved in night-sky photometry 5250
  for sound wave scattering anal. 5927
  integral for heat conduction in solid 5993
  arctan x 6379
  for liq.–liq. interfacial tension det. 6522
  associated sine and cosine integral functions 7375
  Bessel functions 3786, 5828
  for X-ray crystallography (book) 8064
    international tables (book) 7299
  incomplete Fermi–Dirac functions 8643
  associated Legendre functions 8176
Tables, physical see *Collections of physical data*
Tantalum
  radiation damage and recovery 216
  field emission, normal and supercond. state 236
  superconductive transition 241
  ores, activation assaying 2645
  carbide and boride, powders, supercond. invest. 410
  films, elec. conductivity phenomena 4797
  electrodes, TiO_2 or CeO_2 covered, contacts, superconductivity 4813
  surface barrier anal. by Schottky deviations 6120
  radioactive estimation in ferroniobiums and niobium minerals 7267
  heat conductivity below 1°K 7688
  foil, electron energy loss distrib. 7723
  electron ejection by He^+, He^{++}, He_2^+ 7731
  high temp. mag. susceptibility 8558
Tantalum oxide
  Ta_2O_5, anodic, photoconduction 233
Teaching
  physics, understanding of definitions 590
  dimensional analysis, in general physics 592
    conference report 6440
  electronic differential analyser for students 2137
  calculus replacement by numerical series sum method 2213
  closed differential pulley, anal. app. 2214
  simple pendulum 2218
  fluid dynamics 2229
  white light interference, demonstration device 2382
  demonstration boards for circuit computations 2558
  classroom aerial expt. 2567
  echo ranging with audiofrequencies 3076
  half-wave plates, demonstrations 3189
  a.c. circuit demonstrations 3444
  α-particle range, student expt. 4309
  course in radioactive determinations 5052
  undergrad. cosmic-ray expt., lab. 5548
  wave interference and group velocity demonstration 6575
  radiation, avoidance of pschophysical photometric concepts 7537
  models illustrating optical aberrations 7544
Technetium
  problem of stability 7864
Telescopes
  design, physiological optics appl. 8828
 astromical
  optical problems at Palomar 579
  200-in. Hale, spectrographic equip. 2145
  48 in. Schmidt-type, Palomar 2903
  electronic, analysis of improvement 4557
  micrometeorological effects on observation, amelioration 5269
  objective dimensions rel. to atm. turbulence fluctuations 6384
Tellurium
  low abundance in meteorites 10
  single crystals, optical polarization 145
  opt. and elec. charac. (book), 234

Tellurium—*contd.*
- film on mica, conductance modulation by field 1635
- evap. films, elec. resistivity 4084
- width of forbidden energy zone 4088
- thin film capacitance effects 4093
- elec. resist. rel. to mag. field 4108
- low temp. spec. heat 4771
- atomic masses 7052
- use in meas. flow in water 8254
- Te/metal thermocouples 8381–2

Temperature
- deduction of concept from thermal equilib. laws 809–10
- present status of scales 1588
- International Temp. Scale extension below 0 point 3264
- dimensionally consistent unit 6692

Temperature distribution
- round heated cylinder in crossflow 177
- in heat-producing solid behind surface defect 798, 4052
- at end of hot wire 2398
- investigation with models 2403
- gradients in inductively heated cylinders 3441
- in cylinder traversed by elec. current 5434
- thermo-elast. stresses det., tubes 5994
- in internally heated sphere 6694
- contours made visible by phosphors 8333

Temperature measurement see also *Pyrometers; Thermocouples; Thermometers*
- ultracentrifuge rotor, i.r. radiation method 811
- thermocouple, in diffusion cloud chamber 931
- elec., diode cathode temps. 940
- present status of scales 1588
- scale below 1°K, adiabatic demagnetization method 1589
- down to 10°K, thermocouple recording and indicating instr. 1590
- arcs, emission spectrum method 2471
- surface distrib., aerodynamics, phosphor appl. 3026
- International Temp. Scale, extension below 0 point 3264
    - realization, −182·97°C to 630·5°C 3265
- av. temp., by parallel thermocouples 4063
- small resist. thermometers, indust. and lab., survey 4769
- surface temp., review 4767
- normal b. pts. of O on thermodynam. scale 6002
- through-flow recorder in high-speed gas stream 6013
- portable photographic spectrophotometer 6582
- by signal/noise ratio in radio receivers 6731
- specimens in electron microscope 7203
- interferometry application 7620
- flames (book) 7627
- contours made visible by phosphors 8333
- dielec. and semiconductors in h.f. fields 8378
- units, committee report 8383
- **spectral methods** see also *Pyrometers*
    - OH rotational temps., flames, self-absorpt. effects 6718
    - flames (book) 7627
    - high intensity a.c. arc 8431

ensors
- whose elements are Dirac matrices 613
- world tensors, ranks 1 and 2, phys. quantities repres. 2930
- skew symmetric tensor in nonsymm. field theo. 4591
- extension of calculus not needed 7372
- energy-momentum, of e.m. field inside matter 7435
- matter tensors in symmetrical systems 7965

errestrial heat see *Earth, heat*

errestrial electricity see also *Atmospheric electricity*
- hourly variations of field 1293
- 'terrestrial corona' theory of auroral effects 1296
- equatorial ring current effect on cosmic-rays 1729
- rel. to depth, e.m. induction det. 5228
- geoelectric depth soundings eval. 5790
- field anomalies rel. to rock comp. var. 5791
- local resistivity and lightning risk 7364

errestrial magnetism
- activity correl. with ionospheric changes 564
- thermoremanent magnetism, reverse 963–4
    - lavas and clays, invest. 8580

Terrestrial magnetism—*contd.*
- soil, magnetic susceptibility 1272
    - mag. props. rel. to rocks 5792
- e.m. field of rotating magnetized sphere 1273
- magnetic declination calc., Carpathian basin 1275
- field due to earth's rotation, test 2531
- magnetization inversions, origin 3758
- deep-sea investigations 4492
- layer heated below and under Coriolis forces, instability 4762
- dispersion on a sphere 5229
- control of activity by sunspots 6425
- **variations** see also *Magnetic storms*
    - diurnal, ionosphere conductivity explanation 2099
        - dynamo currents and atm. conductivity var. explanation 2100
    - rel. to earth's rotational fluctuations 2919
    - mean field, secular, Adelie Land 5793
    - rel. to conductivity of ionosphere 8120
    - rel. to distribution of sunspots 8191

Thallium
- low temp. deposited film, supercond. props. 5476
- thermal cond., low temp., mag. field 6698
- film, superconducting props. 7684
- heat conductivity below 1°K 7688
- halide mixed crystals, inhomogeneity elim. 8048

Thermal conductivity see *Conductivity, thermal*

Thermal diffusion see *Diffusion, thermal*

Thermal expansion
- linear, of crystals, internal strains effect 535
- Ranque vortex tube, exptl. invest. 808
- calc., interatomic force non-linear approx. 1800, 8610
- liquids, calc. from liquid properties 2999
- α- and β-Ag_2S 2338
- solids, theory 2405
- Ge, −196° to 275°C 3235
- Ft–Pt alloys, abnormality 4054
- alkali halides, rel. to melting point 4471
- of high polymers 6303
- solar furnace in dilatometric studies 6707
- method for solids between 0 and 180°C 6708
- liquid helium, theory 6722
- V_2O_5, near transformation temp. 6951
- Zr, between 298°K and 1600°K 7623
- Gd, Dy, La, Nd, anomalies 7624
- antiferromag. CrSb, rel. to mag. mom. orientation 8357
- glasses, review 8710
- naphthalene, anisotropic 8798

Thermal measurements see also *Calorimetry; Conductivity, thermal; Temperature measurement; Vapour pressure measurement*
- heat conductivity, plates, without guard ring 1569
- soil thermal resistivity, rapid meas. 1570
- conductivity coeffs. solids and liq., app. 4756
- app. for f. pt. diagram det. 6000
- partial thermal accommodation coeff. det. 6018
- conductivity of liquids 6696
- KBr and KI high temp. enthalpies det. 6734

Thermal transformations see also *Boiling; Heat of transformation; Melting; Phase transformations; Vaporization*
- thermally induced colour change in ultrasonic image conversion 88
- transition temps. in NH_4Cl, NH_4Br solid solns. 181
- $BaCa_2$ *n*-butyrate 182
- solid-liquid critical point 183
- colour change in ZnO, mechanism 758
- ammonium dichromate crystals, detect. and meas. 800
- metallurgical, proof with needle counter 801
- In–Tl solid solns, 45–60°K 839
- the aluminas and their hydrates 1261
- 2nd-order transition points meas., high polymers 1576
- transformation press. effect on fusion heat 1577
    - effect on melting vol. change 1578
- hysteresis at A_3 and A_4 points, Fe 1579
- solid to liquid, theory 2238
- 2nd-order trans. rel. to critical phenomena 2407
- He I/He II in He^3/He^4 mixt. 2411
- in Co, by macroscopic shear 2755
- higher Fe carbides 2777

A complete list of the Subject Headings will be found at the end of the Index.

Thermal transformations—*contd.*
- statist. mech. of phase transition 3240
- allotropic, in U, cooling rate effect on temp. 3241
- phase trans. in solid H halides 3242
- Zr–Hf system, allotropic 3243
- Xe liq.-vapour coexistence curve, critical region 3244
- order-disorder in Fe–Ni alloys, $FeNi_3$ region 3719
- pure Mn, magnetometric studies 4056
- KH_2PO_4 ferroelec. state onset 4073
- solid *cyclo*hexane 4267
- hexagonal to cubic in Co 4764
- chemical reactivity, quartz cracking due to 5203
- $BaTiO_3$ 5454*, 5778
- polymorphic, in ferromag. subst., mag. field influence 5605
- Cu–Al, electron diffract. study 5733
- temperatures, in dihydrogen and dideutero phosphates and arsenates 6003
- in $LiF–BeF_2$ system 6318
- Ca, Sr and Ba sulphates 6319
- glycerine, liq. to solid, refract. index discontinuity 6597
- pseudo-adiabatic, of open gaseous systems 6693
- anhydrous Na_2CO_3, transition points 6713
- solid He 6725
- V_2O_3, development of props. near trans. temp. 6951
- in antiferroelec. $PbHfO_3$ 7656
- persistence of crystal axes in transformation 8107
- Bi I to Bi II at high press. 8358
- NH_4NO_3 metastable phase change 8362
- O, below 4°K? 8384
- $BaTiO_3$, 120°C transition, dielect. meas. 8392
- *n* to *p* conversion, Ge, mech. 8405
- Co, martensitic 8765

Thermionic emission see also *Ionization, surface*
- **electrons** see also *Cathodes*
  - BaO, temp. dependence (and BaSrO) 225
    - cathodoluminescent spectrum 1548
    - films, rel. to thickness 3401
    - rel. to luminescence 4031
  - survey of present knowledge 297, 4181
  - counter-detected, change on phase trans. 801
  - iron group of metals, constants 937
  - metals of first transition group 2516
  - Schottky effect, periodic deviations in Mo 2517
    - eq. derivation 2518
    - deviations in metallic surface barrier anal. 6120
    - W photoemission in predicted deviations region 7680
  - oxide-coated W, factors affecting 2519
  - thoria, thermionic props. 4888–9
  - emission in cold to thermionic transition range 6080
  - constants of Cu, Ag, Au 6905
  - Si, 1100°C to 1350°C 6906
  - oxide cathodes, rel. to elec. conductivity 6907
  - l.f. fluctuations temp. dependence 6908
  - metal capillary cathodes 6909
  - energy distribution in beam 7710
  - graphs for work function calc. 7747
  - Ge filament shot effect explanation 7750
  - from metals, as irradiation after-effect 8482
- **ions**
  - K and Na ions neutralization on W and Ta 939
  - solid ion sources, prep. in induction and solar furnaces 5547
  - multiple filament source for mass spectrometry 6866
  - alumino silicates, mass spectrom. study 6911

Thermionic tubes see *Electron tubes*

Thermochemistry see *Heat of reaction, etc.*

Thermocouples
- portable indicating moving-coil instr. 193
- switching equip., using P.O. type uniselector 194
- Pt/Pt-Rh, behaviour at high temps. 813
- temp. meas. in diffusion cloud chamber 931
- intensity meas. appl., vac. u.v. 1497
- for temp. meas. down to 10°K, modifications 1590
- parallel-connected, av. temp. meas. appl. 4063
- principle of superposition 4113
- surface temp. meas. appl. 4767
- for radiation, semicond. thermoelec. matls. use 6733
- conditions for temp. meas. in h.f. fields 8378
- fine-wire, strengthening method 8379
- Te/metal assemblies as fast thermocouples 8381–2

Thermodynamic potential
- thermal potl., generalization 792
- 2nd law rel. to retarded potentials 1599, 4780
- degenerate electron gas, temp. var. 2211

Thermodynamic properties see also *Critical constants; Entropy; Heat capacity; Heat of reaction; Thermal transformations; Thermodynamic potential*
- in soln., cooperative orientation effect 65
- diacetylene 196
- GeF_4, calculated 197
- formic acid 199
- diatomic interhalogens, from spectroscopic data 201
- ClF_3 203
- ethyl alcohol 822
- ethane 3rd virial coeff. 1438
- BrF_5 1551
- Na vapour, from spectroscopic data 1597
- $CHClBr_2$ and $CDClBr_2$, calc. 1804
- of some special fields 2185
- oxalyl chloride, calc. 2340
- CO, 0 to 150°C, up to 3000 atm. 2428
- CF_3Br, CF_3I 2591
- gaseous hydroxylamine 2592
- mixtures of oriented molecules 3008
- S-containing molecules 3276
- saturated water 3280
- kinetic energy at critical point 4057, 8364–5
- *W* log *p* diagrams, methane, ethylene 4065
- systems with arbitrary no. of integrals 4623
- liq. organic compd., rel. to u.s. vel. 4665
- real gases (book) 5147
- diamond, low temperatures 5446
- CH_2BrCl calc. from spectral data 5635
- from Mayer's ionic solutions theory 6021–2
- thermodynam. and molec. distrib. functions rel., mixture 6528
- propylene 6537
- CF_3D thermodynam. functions 6620
- solid He 6725
- crystall. Se, low temp. 6736
- methane adsorbed on rutile, 80°–140°K 6737
- monatomic fluids, radial distrib. function calc. 6741
- gases in equilib. or reacting isotopic substitution effect 8004
- glasses, review 8710

Thermodynamics see also *Atmosphere, thermodynamics; Entropy; Equations of state; Thermodynamic potential*
- interacting particles assemblies, quantum mechanics 202
- heat work equiv., Joule–Thomson effect meas. 204*
- advances, review 819
- superposition principle and Onsager's equivalence 820
- virial theorem in Thomas–Fermi theory 1439
- relativistic statistical 2964
- first law, for open systems, nature 3279
- Boltzmann's *H*-theorem, statist. aspect 3278
- irreversible processes (book) 4067
  - quantum-statistical anal. 1399
  - fluctuation–dissipation theorem generalization 1595
  - statistical mechanics 6492–3
  - generalized statist. mech. and Onsager relations 6494
  - linked to internal degrees of freedom 6738
  - analysis of nonequilibrium systems 6739
  - variational principles 6740
  - Onsager's rel. from classical thermodynam. 7645
- minima of energy dissipation 4068
- "intensity parameter," axiometic interpretation 4775
- *H* theorem and unitarity of *S* 4776
- physical principles (book) 4777
- wave-mechanical restrictions on Maxwell's demon? 5308, 7472
- statistical, of solutions, test of theory 5448
- special relativity continuum theory 5847
- pseudo-adiabatic transformations of open gaseous systems 6693
- in general relativity 8208
- **applications**
  - statist. theory of crystallite length 371
  - butadiene dimerization and vinylcyclohexene dissoc., kinetics 500

- **Thermodynamics**—*contd.*
  - **applications**—*contd.*
    - H overvoltage 511
    - shear rate influence on liquids miscibility 653
    - sound vibration invest. in tube containing heat source 671
    - high temp. gases in shock tubes 681
    - temperature concept 809–10
    - inorg. free radicals in soln. 1204
    - deuterated ADP crystal, props. interpretation 1237
    - transformation press., effect on fusion heat 1577
      - effect on melting vol. change 1578
    - hysteresis, at A_3 and A_4 points, Fe 1579
    - dilute systems, irreversible processes 1596
    - sedimentation potl. and electrophoresis, non-equilib. thermodynamics 1651
    - irreversible electrochem. processes 2012, 8386
    - Brownian motion, irreversible processes theory 2210
    - low temp. thermal radiation, anomalies 2305
    - reversibility and irreversibility in optics 2306
    - irreversible processes to He II and Knudsen effect, gases 2418
    - some fatty acids, ionization 2781
    - He I/He II transition in He^3/He^4 mixt. 2411
    - critical soln. phenomena, statist. thermodynam. appl. 3012
    - gases, thermal conductivity theory 3230
    - water-triethylamine system near lower crit. point 3277
    - molten alloy gas absorpt., statist. thermodynam. 3919
    - fusion and condensation theory 4055
    - Onsager's relations, not appl. to diffusion flux 4066
    - electrodynam. potl., Onsager relationships 4083
    - equilib. in glasses, irreversible approach 4401
    - exchange adsorpt., clay minerals 4436
    - thermomechanics of transport phenomena 4642–3
    - fusion theory 4779
    - irreversible chem. reactions 5149–51
    - colloidal particle double layer energy 5161–2
    - single plane double layer, Poisson–Boltzmann eq. 5163
    - irreversible process theory, electrochem. half-reactions 5164
    - heterobaric phase transitions 5437
    - irreversible low-temp. processes, anal. 6023–4
    - reacting gases, thermal conductivity 5997
    - He film 6009
    - refrigeration, dynamic heating cycle theory 6019
      - machines having combined cycles 6020
    - of superconductor configuration 6025
    - statist. thermodynam. of rubber elasticity 6262
    - $CaO–SiO_2$ system solid-phase reactions 6282
    - relativistic fluid 7422
    - $C_p - C_v$ in Si and Ge 7641
    - statist. theory of linear dissipative systems 8243
    - magnetron, irreversible thermodynamics appl. 8476
    - magnetization curve analysis 8520
- **hermoelectricity** see also *Thermocouples; Thermopiles*
  - electron gas in porous semiconductor 222
  - (BaSr)O and BaO 225
  - meas. on *p*-type Si 244
  - BaS thermoelectric power 294
  - Pt/NiS/Pt thermoelec. power 848
  - two-band conductor effects 1629
  - asymmetrical temp. grad. in Cu and Pt 1649
  - magneto-thermoelec. power Fe single crystal, low temp. 1650
  - graphite, thermoelec. power 20° to 300°K 2463
  - shear strain effect on e.m.f., cubic metals 2469
  - Ge rectifiers elec. forming study 3310
  - induced potential from radiation damage 3320
  - electrodynamic potl. theory 4083
  - due to cold work, metals 4110
  - $MoSi_2$, evidence for metallic nature 4112
  - Sn and Ag behaviour at liq. He temp. 4817
  - meas. for v. small temp. differences 5484
  - u.s. field intensities indicator, liquids 6559
  - molybdenite, thermoelectric power 6768
  - e.m.f. in a monometallic circuit 6810
  - low temp., Na, K, Cu, electron scattering data 7690
  - liq. Se. thermoelec. power 7691
  - of semiconductors, theory and expt. results 7692
  - Te/metal, thermo e.m.f. and sensitivity 8381–2
  - MgO thermoelec. power 8411
  - $Cu_2O_3–Al_2O_3$, thermoelect. potential 8412
- **Thermometers** see also *Pyrometers; Thermocouples*
  - integrating, liq. viscosity var. appl. 2425
  - "radio," sensitivity 6731
  - **resistance**
    - pressure influence on thermistor resistivity 812
    - Pt, used in International Temp. Scale realization 3265
    - surface temp. meas., appl. 4767
    - for indust. and lab. purposes, survey 4769
    - graphite for very low temp. 7639
- **Thermonuclear reactions** see also *Elements, origin*
  - proton–proton chain, in stars 588
    - energy produced in sun 2691
    - rate rel. to stellar energy prod. 4577
  - detonation of proton gas 4347
  - origin of elements, conference report 6437
  - sensitivity, stellar vibration stability appl. 6438
- **Thermopiles**
  - spectral reflectivity meas. 7638
  - Moll, radiant heat meas., sampling errors 8380
- **Thermostats**
  - ultracentrifuge rotor temp. control 811
  - continuous action, circuit design 814
  - heat exchanger regulator stability, fusion of roots method 1591
  - for obtaining 50°K without liq. H 3263
  - wide-range controller, thermistor 3266
  - gas-flow cryostat 4267
  - bath for low temp. studies 6005
  - cryostat for low temp. mag. susceptibility meas. 6006
- **Thickness measurement** see also *Optical lever; Particle size*
  - rubber, ultrasonic phase lag method 59
  - fine particles 637
  - by 3-beam interference 779
    - possible error 6670
  - thin film, with Köster interference prism 1558
  - radioactive gauge, paper mill appl. 2683
  - interferometric, simult. with optical constants 3177
    - plane-parallel plates 4691
    - films for grating blanks 5981
  - u.s. harmonic method, resonance condition 3934
    - results 3935
    - lower order resonance 3936
  - optical thickness, interferometer microscope appl. 4742
  - up to 10 mm, by X-ray absorpt. 4827
  - with β-rays, under 1 mm 5310
    - nonferromag. layers on nonferromag. support 5311
  - with γ-rays, from 10 to 100 mm 5312
  - use of Be-window low-voltage X-ray tubes 5511
  - metals, bob suspended from drum 5713
  - transparent film, opt. transmission meas. 6596
- **Thixotropy**
  - viscosimeters 2987–8
  - shear temp. effect on viscosity 2791
- **Thoria**
  - as thermionic emitter 297
  - crystalline, optical properties 763
  - thermionic properties 4888–9
  - phosphorescence 6657
  - cathodes, emissivity 7751
- **Thorium**
  - vapour, in discharge lamp 176
  - monatomic layer, effect on thermionic emitter 297
  - boride, powder, supercond. invest. 4107
  - determination in ores 5187
  - det. in surface rocks 5231
  - use in metal capillary cathodes 6909
- **Thorium carbide**
  - as thermionic emitter 297
- **Thorium oxide** see *Thoria*
- **Thunderstorms** see also *Lightning*
  - elec. field variations due to lightning discharges 1294
  - high-energy electron production 2853
  - thunderclap recording and acoust. charac. 2859
  - effect on cosmic-ray intensity 4184
  - radar detection, conf. rep. 6973
  - charge generation by ice formation 8134
- **Tides**
  - lunar influence on *F*2 layer centre height 1282
  - free oscillations in rotating sea 1353
  - gravity waves symposium 2998
  - oceanic, effect on earth's rotation 3842, 7410
  - atmospheric, world-wide oscillations 5238
    - synchronism with earth's rotation 7409

A complete list of the Subject Headings will be found at the end of the Index.

Tides—*contd.*
    "polar," in sea and atmosphere 5286
    automatic devices for tidal models 6519
Time interval measurement
    electronic spark timing device 638
    quartz standards appl. 2981
    ultra-short, scint. detectors appl. 4163
    v. small intervals, spark counter appl. 4631
    short intervals by powder pattern meth. 6505
    small intervals, survey 6506
    in ballistics, recurrent sweep chronograph 6507
    millisec. indicating and recording 8250
Time measurement
    annual fluct. quarterly revision for freq. standards 14
    atomic clocks and freq. stabilization 2162
Tin
    grey, opt. and elec. charac. (book) 234
    enriched isotopes, de Haas–van Alphen effect 327
    thermal resist., rel. to field strength 865
    ultrasonic waves, velocity 1448
        absorption 5918
    superconductivity, transition region meas. 1646
        below 1°K, thermal conductivity 3317
        0°K, penetration depth rel. to In impurity 4106
        low-temp. deposited film 5476
        surface resistance at 9400 Mc/s 5477
        rate of prop. of superconducting phase 6806
        meas. in thin films 7685
    whiskers, growth 2045, 8050, 8767
    prismatic substruct. formation during solidification 2046
    anomalous skin effect invest. 2458
    thermal oxidation, amorphous layer 2756
    liquid, X-ray scatt. struct. det. 2757
    deformed by rolling, X-ray study 2759
    resist. rel. to mag. field, low temps. 3319
    isotopic ratios from tetramethyl mass spectra 3393
    binary alloys crystallization 3712
    single crystals, from melt 4463
        spherical, preparation 4464
        macromosaic structure 7273
        dendritic growth 7274
    thermoelec. power at liq. He temp. 4817
    surface tension at m. pt. 5323
    molec. evap., ion cluster formation 5524
    thermal conductivity, low temp., mag. field 6698
        below 1°K 7688
    SnI_4–CCl_4 diffusion, press. effect 7495
    coeff. of cathode disint. in elect. arc 7696
    foil, electron energy loss distrib. 7723
    elastic wave velocity rel. to temp. 8285
    film, structure loosening 8717
        evaporated, optical const. det. 158
Titanium
    superconducting props. below 1°K 864
    thermionic constants 937, 2516
    single crystals, growth spirals 2807
    Hall effect 3469
    carbide and boride, powders, supercond. study 4107
    paramag. reson. absorpt. 5568
    crystallography of transformation 8095
    thermal cond., low temp., mag. field 6698
    film, electron microscopy replica 6256
Titanium oxide   see also *Rutile*
    form of TiO_2 as new dielec. matl. 830
    film, as rectifier 2453
        as near i.r. selective reflectors 5977
        refractive index and thickness meas. 6596
Toluene
    elec. conductivity, d.c. meas. 2457
    Rayleigh's ratio, value and det. 7614
    photochem. and thermal bromination, bond dissoc. energies 8024
Topaz
    corrosion figures, dislocation interpret. 7286
Torquemeters
    electromag., for use in viscometry 7483
Torsion   see also *Elastic constants; Stress analysis*
    vibrating bars, effect of dia. var. 668
    rubber tube, rigid rods model 3645
    max. stress in notched shaft 6498
    vibrations of high-polymers and relaxation periods 7209

Tracers   see also *Radioactive tracers; Radiochemistry*
    C^{13}/C^{12} in CO_2, infrared analyzer 7060
    D, in flame spectra 7233
Track photography   see *Particle track photography*
Transducers   see *Acoustic transducers*
Transformations, geometric
    dynamical study of groups 1
    analogue computer for coordinate transformations 1333
    Laplace, supersonic flow appl. 1434
        radiation intensities emergent from stellar atm., appl. 3830
        appl. with harmonic synthesizer in circuit anal. 6382
    canonical, for electron–positron field coupled to unquantized e.m. field 2189
    conformal, maps appl. (symposium) 2891
        kinematical relativity appl. 4585
        appl. to field invest. near corrug. sheet 6745
    the Lorentz transformation 4587
    so-called homology of crystals 7272
    special contact transformations, for e.m. fields 8458
    in orientation of crystal plates 8759
Transforms
    Laplace, inverse, in servomechanism theory 578
        rod's longitud. vibr. appl. 3890
Transmission
  acoustic waves   see also *Acoustic wave propagation*
    in buildings, American and European meas. methods 92
    through plates, transmittivity expression 3044
    atmos., meteorolog. conditions effect 5341
    transmittivity of plates, effect of losses 5922
  electromagnetic waves   see *Electromagnetic wave propagation*
  light   see also *Absorption, light; Filters, optical*
    optical matls. in Schumann region, temp. var. 140
    i.r., by Te single crystals, rel. to polarization 145
    sputtered CdO layers 224
    BaF_2, CaF_2, compared 489
    vac. u.v., meas. app. 777
    atmospheric, field of view influence 1291
    CdS 1547
    stratified media; light rays reversibility 2357
    $KCrO_4$ solution u.v. standard 2359
    multi-layer film, matrix eq. 2381
    u.v. radiation (book) 2394
    commercial glasses, irradiation effect 2637
    i.r. limits of fluoride single crystals 3148
    thin films, simultaneous thickness det. 3177
    u.v. sunlight at 11 000 ft 3773
    crystall. CdF_2 4023
    Al films 4718
    multi-layer dielectric films, 4000 to 4600 Å 4738
    interference systems with given spectro-properties 4739
    through fog, 4320 Å to 9500 Å 5803
    near i.r., in Bi, wavelength dependence 5967
    oblique, multilayer thin films factor 5978
    propagation through crystal plate, equations 6578
    refract. index and thickness meas., thin films 6596
    for u.v., thin films Al and SiO 7582
    very thin metallic films 8343
Tritium
    production in meteorites by cosmic rays 4182
    meteorological and allied investigations appl. 5805
    T-labelled liquids, scintillation counting 6885
    production in atm., data from (n, H^3) meas. in N 7935
Tritons   see also *Nuclear reactions, tritons*
    proton-triton interaction 912
    binding energy theory 1029
    from *d*-induced reactions on Be^9, ang. distrib. 1122
    β-decay 1883
    from (d, t), ang. distrib. 1910
    from Pb^{206-8} (d), spectra 2700
    $Be^9(d, t)Be^8$, ang. dependence and yield 3583
        low-energy, ang. distrib. 4354
    neutron-triton scattering at 14 MeV 3606
    nuclear reactions induced in Li-loaded emulsions 7924
    range-energy, from $Li^6(n, t)He^4$ 8460

Tungsten see *Wolfram*

Turbulence see also *Cavitation; Vortices*
- moving profile in non-stationary regime 645
- aspects of problem, survey 646
- in magneto-hydrodynamics, compressible medium 2992
- sun, photosphere, effect on long wavelength spectra 3808
- Reynolds' transformations, algebraic props. 5321
- spiral nebula theory contrib. 5834
- fluid mixture due to, continuity study 6533
- theory, correlations method appl. 7471
- homogeneous, theory of (book) 7487

aerodynamics
- longitudinal and time correl. comparison 1431
- turbulent mixing study, tracer method 1435
- isotropic, in magneto-hydrodynamics, equations 2232
- isotropic spectrum 2254
- theory, acoustic noise propagation appl. 3039
- atmospheric, criterion 5239
- interaction with sound waves, scattering 8295

hydrodynamics
- damping by magnetic field 2991
- Heisenberg's model, extens. to crit. Reynolds nos. 3907
- effect on heat transfer, liq. reactant pile 4375
- transition to, in incompress. flow along plane 4639

Twilight see also *Atmospheric spectra*
- brightness and colour, O_3 effect 2852
- stars and planets visibility 2915
- discontinuities, atm. temp. max. at 50 km as cause 5247
- secondary scattering, brightness calc. 5248
- anomaly, rel. to turbidity 8129

winning see *Crystals, twinning*

Ultracentrifuges see *Centrifuges*

Ultrasonics see also separate headings, e.g. *Absorption*
- phase lag method for rubber thickness meas. 59
- effect on metallic corrosion 87
- image conversion by thermally induced colour change 88
- diffract. by light, visible by phase contrast 163
- flaw-detectors, hollow cylinder reflections 688
- physics textbook 693
- l.f. modulated, in gases, acoustic detectors operation 696
- portable outputmeter, and its calibration 699
- electro-mech. Q-meter for elast. const. meas. 1187
- influence on $CuSO_4$ and $Pb(NO_3)_2$ elec. conductivity 1214
- tyre inspection method 1453
- oxidation, due to KI 2018
  - inhibiting effect of O acceptors 5761
  - N in water containing air 8029
- resuspension of Dow latex 580G 2029
- on water, u.v. emission 2267
- behaviour in liquids, review 3043
- transducers for producing u.s. waves 3055
- h.f. reciprocating drill appl. 3063
- telephone transmission appl. 3064
- testing techniques for rubber products 3065
- direct viewing in solid 3952
- use in experimental neurology 4521
- fracture propag. invest. in glass 5144
- effect on rate of hydrolysis of ethyl acetate 5746
- electrochemical applications 5747
- colloidal and ionic vibration potentials 5748
- potential gen. on porous-coated wire in solution 5749
  - polarized H electrode 5750
- exploration of biological tissues 5813
- continuous ultrasonic viscosimeter 6512
- diffusion of waves in liquids 7530
- detection of stratifications in matls. 7532
- sp. ht. ratio meas., A and N 7642
- low temp. elastic const. meas. method 7989
- processing of plasma 8137
- effect on movement of particles in liquids 8267
- ultrasonic microscope 8298
- interference patterns made visible by phosphors 8333

ncertainty see *Indeterminacy; Probability*

nits see also *Constants; Dimensions*
- and dimensions, theory 15
- M.K.S. system advantages 591

Units—*contd.*
- dimensional analysis contradictions 1601
- Nat. Bur. Stand., elect. and mag. 1737
- symbols for, use in equations 3844
- in illuminating engineering and photometry 6588
- photometric, reduction in number 6589
- temperature, dimensionally consistent 6692
- basis of international system of measurement 8200
- rationalization in physical equations 8201
- thermometry, calorimetry, photometry, committee report 8383
- röntgen, source of error in standard 8441

Units, electrical
- M.K.S. system advantages 591
- dimensional anal. contradictions 1601
- Nat. Bur. Stand., dissemination 1737
- electro-mech. systems compared 3845
- rationalized rel. to unrationalized, measures calculus 3846
- ohm, absolute determ. 6765
- basis of international system of measurement 8200

Uranium
- U-containing mineral, "chemical" age det., RaD method 1047
- allotropic transformation temp., cooling rate effect 3241
- determination in ores 5187
  - fluorimetric 4460
- preparation of crystals 5193
- rare in Switzerland 5667
- thick, Co^{60} γ-ray transmission, meas. 6216
- thermal etching 8052

Uranium fluoride
- UF_6 viscosity discrepancies 3016
- UF_6 physical properties 4634

V-particles see *Mesons*

Vacuum apparatus see also *Glass-metal seals*
- textbook 77
- flowmeter for Q-value meas. 2253
- vacuum lock for mass spectrometer 3019
- needle valve for mass spectrometer leak 6865
- for ultra high vacuum 8274
- Wilson seal, force reqd. to pull through 8275
- vacuum anemometer 8276
- vacuum furnace for Ge single crystal pulling 8768

Vacuum gauges
- textbook 77
- Pirani, development and design 1427
  - combined Pirani and ionization, circuit 4651
  - with Pd window, H in N meas. appl. 7266
- ionization, simplified circuit 1430
  - combined Pirani and ionization, circuit 4651
  - magnetron 6541
  - cold-cathode, gas sorption and desorption 6543
  - for ultra high vacuum 8274
- for high and low vacua, constr. 4650
- operation of Penning gauge 6542
- diaphragm micromanometer 7505

Vacuum pumps
- textbook 77
- pumping speed in diaphragm aperture 1428
- ionization method, "electronic" pump 5897
  - high vac., high speed ion pump 5898
  - ultra high vacuum technique 8274
- Hickman type, oil diffusion, constr. 4650
- steam-jet, theory 5899
- Hg vapour jet, supersonic rel. 5900
- diffusion pump oil, mass spectrom. study 6538
- assessment of working fluids 6539

Vacuum technique
- textbook 77
- elec. breakdown meas. 249, 7697
- pumping speed meas. in diaphragm aperture 1428
- study of vacuum evaporation 3020
- comparison of high vacuum stills 3023
- some high vac. systems 4650
- leak detection by H–Pd 6540
- Th powder sorption props. 7506
- ultra high vac., prod. and meas. 8274

Vacuum tubes see *Electron tubes*

Valency
- cyclobutane structure invest. 1017
- interactions in vibrating molecules 1812

- **Valency**—*contd.*
  - CH_3 valence theory 1815
  - directed, rel. to geometry of surroundings 3700
    - and determinant wave functions 4264
  - state in $FeCuO_2$ 5643
  - molecular orbital theory, 7012–3
    - diatomic molec. excited states 3510
    - "semi-localized orbital" theory 3511
    - homonuclear diatom. molec. 4259
    - and valence bond function rel. energies 7007–8
  - of transition metals in alloys 8035
  - NH valence freq. in pyrrhole and benzopyrrholes 8748
- **Valves** see *Electron tubes*
- **Vanadium**
  - thermionic constants 937
    - determination 2516
  - carbide, powder, supercond. invest. 4107
  - paramag. reson. absorpt. 5568
  - thermal cond., low temp., mag. field 6698
  - magnetic struct., neutron diffract. study 8525
  - high temp. mag. susceptibility 8558
- **Vanadium oxide**
  - V_2O_4, thermomagnetic curve between 81° and 680°K 321
  - V_2O_3, development of props. near transformation temps. 6951
  - VO_2, antiferromag. reson. 8541
- **Vaporization** see *Boiling point; Condensation; Distillation; Evaporation; Heat of vaporization; Thermal transformations; Vapour pressure*
  - Xe liq.-vapour coexistence curve, critical region 3244
- **Vapour density** see *Density, gases*
- **Vapour pressure** see also *Humidity; Vaporization*
  - He^3–He^4 mixtures, below λ point 188
    - calculation 1585
    - solution non-ideality calc. appl., 3253
    - sat., cluster theory 6008
  - BaS 294
  - atmospheric, semi-diurnal wave 565
  - curve, corresponding states appl. 2238
  - liq., rel. to temp., eq. 2406
  - pyridine-ethanol system, approximation to Raoult's law 3237
  - liquid germanium 3238
  - UF_6 −15° to 100° 4634
  - of solutions and mixtures 5448
  - liq. mixtures, Duhem–Margules eq. 6001
  - of KCl crystals 6709–10
  - liquid nitrogen 6712
  - H_2O, 0 to 100°c, calc. 7625
    - −20 to 200°c calc. 8359
  - deuteromethanes 7626
  - liquid He^3 8372
- **Vapour pressure measurement**
  - solutions, differences det., thermistor bridge method 2246
  - metal ebulliometers 3239
  - Knudsen effusion method accuracy 8360–1
- **Variable stars**
  - Cepheids, period, spectral type and phase difference rel. 1347
    - and RR Lyrae, period-luminosity rel. 2152
  - high mass conc. and pulsation 4575
  - light-time orbit det. 2153
  - adiabatic pulsations 2917
  - astrophysics symposium (book) 3795
  - density distrib. invest. 6434
  - in Orion, and turbulence in nebula 8194
- **Variational calculus** see *Calculus, variational*
- **Vectors**
  - new vector identity, physical appl. 206
  - some vector formulae and their appl. 5579
- **Velocity**
  - qualitative magnitude in relativistic mechanics 1363–4
  - **acoustic waves** see also *Liquid helium, sound propagation; Shock waves*
    - in granular media, theory 674
    - initial, of spherical blast 678
    - in van der Waals gas 682
- **Velocity**—*contd.*
  - **acoustic waves**—*contd.*
    - measurement, systematic errors in indirect method 703
      - precise, in air 2293
      - in gases, shock tube method 3943
      - field meter 5933
    - in gases, detonation waves effects 1209
    - in Fiberglas 2304
    - 2nd sound, calc. for media other than He II 2420
    - attenuation in shock tube 3042
    - longitudinal magneto-hydrodynamic waves effec 5339
    - molecular, in liquid mixtures 6527
    - in liquids, rel. to viscosity 6557
    - in high polymer liq. 8287
    - in air at low pressures 8288
      - **ultrasonic**
    - in Xe, crit. temp. region 676
    - book notice 693
    - in metals 1448
    - *cis*- and *trans*-dichloroethylene vapours 1457
    - swollen Buna-N rubber study 2263
    - in suspensions, temp. dependence 2264
    - in blood and its components 3040
    - in A, up to 950 atm. 3041
    - effect of interference, reflected waves 3061
    - measurement, pulse method for solids 3067
      - pulse method for concrete, etc. 90
      - in liquids, precision method 6554
    - rel. to adiabatic compressibility, hydrocarbo mixtures 4663
    - in liq. O, N, A, CH_4, H 4664
    - in liq. organic compds., and adiabatic thermodynam prop. 4665
    - supercooled H_2O and D_2O 5319
    - in ethylene glycols, temp. dependence 5891
    - in human and animal tissue 5913
    - in solutions and mixtures 6556
    - in ethane, near critical region 7524
    - in N, up to 1150 atmos. 7525
      - spec. heats ratio det. appl. 7643
    - molecular, 37 mutually soluble liq. mixtures 7526
    - in gaseous SO_2 7527
    - thermal diffusion meas. appl., H_2–N_2 mixtures 8270
    - in methane, up to 950 atm. 8286
  - **light**
    - in textbook 98
    - band spectrum method, precision det. 100
    - value adopted for Shoran measurements 336
    - in Lorentz transformation physical interpret. 2173
    - effect of gravitational ray 2174
    - radar, cavity resonator and optical methods compared 2981
    - dispersion in liquids, rel. to molec. motion 3001
    - internal dispersion in fluids 3002
    - precision of optical methods 3078
    - short e.m. waves, surface wave resonator method 6581
    - from binary stars, Riemannian space appl. 7419
- **Velocity measurement** see also *Stroboscopes*
  - falling snowflakes 5808
  - projectile speed meas. methods 6508
  - mechanical hodoscope 8245
- **Vibrating bodies** see also *Crystals, lattice mechanics; Elastic waves; Pendulums; Piezoelectric oscillations*
  - rods, eigenvalues and eigenfunctions 667
    - damping meas. 1997
    - and tubes, large amplitude, audiofreq. propagation 5911
    - cylindrical, elastic waves 8278
  - torsional, effect of dia. var. in bar 668
    - calc. by effective masses theory 1442–3
    - effective masses and resonant freq. det. 5332
    - reson. freq., effect of minor system changes 5333
    - of high-polymers 7209
    - continuous mass and stiffness-distrib. systems 7516
    - elec. resist. analogy 7517
  - finite isotropic disk, axially symmetric 669, 5337
  - evaporating liquid drops 670
  - stability conditions of a linear system 1444
  - plate, complex vibrations, sound radn. eval. 1460
  - metal single crystals, amplitude pulsations 1979

- **Vibrating bodies**—*contd.*
  - vibrating-plate viscosimeter 2228
  - piezoelec. crystal plates, electro-mech. system 2439
  - quartz plates, piezoelec., even and half-odd harmonics 2440, 8279
  - metal reeds, internal friction meas. 2775
  - pulsating bubbles, reaction with submerged solid 3033
    - freq. rel. to shape 5325
  - elastic shells in fluid medium 3034
  - gramophone pick-ups, mech. impedance meas. 3036
  - simple sources in isotropic solid, impedances 3052
  - linear systems, stability, polynomial zeros 3781
  - u.s. method for plate thickness, coupling 3934
    - results 3935
    - lower order resonance 3936
  - beam, flexural vibr., normal modes det. 3937
  - oscillating strip, sound pulses diffract. 3955
  - pre-stressed circular plates 4624
  - reson. freq. correction by J_{eff}-value 5334
  - algebraic appl. of effective mass method 5335
  - metal rings, acoustic anal. 5905
  - normal mode freq. changes with temp. and vol., statist. theory 6979
  - 3-mass systems, nomographic soln. 7514
  - effective masses, in-line- or block-motor plant appl. 7515
  - string, canonical field theory appl. 7520
    - bowed, small bowing speed effect 8280
- **Vibrations** see also *Acoustics; Damping; Oscillations; Vibrating bodies; Waves*
  - pipe tone rel. to dimensions and gas disch. press. 672
  - stable, of elastic semispace, theory 1440
  - mechanical systems, duality appl. 1441
  - Dirac δ-function appl. 2212
  - frequencies resulting from distortion 2285
  - forced, amplitude det., effective mass method 5331
  - primary *Pfeifenton* freq. relationships anal. 5906
  - non-linear distortion, intermodulation meas. 6552
  - Rayleigh-type, forced, eq. solns. 7518
  - in metals, velocity and wave number rel. 7813
  - **excitation**
    - sound, in tube containing heat source 671
    - surface motion due to oblique elastic waves 3030
    - vanes singing in water 3031
    - edge-tones, mechanics 3938
      - and jet tones, review 7521
    - organ flue pipe, review 4661
    - turbulent jets, Schlieren photographs 7522
    - magnetostrictive, in ferrites, dynam. parameters 7811
  - **measurement** see also *Seismographs*
    - electronic vibrometer, elasticity modulus meas. appl. 1189
    - "textural" piezoelec. Rochelle salt laminae 1469
    - transient waves through solids 3035
    - electromech. pick-up calibration, interferom. method 3939
    - e.m. vibration pick-ups, seismic suspension 4662
    - u.s., H jets appl. 5327
    - by harmonic analysis of modulated interference picture 5418
    - transverse, of rods and reeds, transducer method 8281
- **Viruses**
  - small-angle X-ray scatt. study 1972
  - electron microscopy 2762
- **Viscosimeters**
  - oscillating cylinder, theory 60
    - formula 8253
  - rotation-vibration, for highly viscous liquids 639
  - new apparatus for water viscosity 2227
  - vibrating-plate 2228
  - rotational, shear temp. effect 2791
  - thixotropic matls. viscosity time-dependence meas. 2987
  - for instantaneously thixotropic fluids 2988
  - concentric cylinder, shearing rate 2990
  - band type, near Newtonian fluids appl. 3901
  - for gas viscosity, high press. 3926
  - for anomalous flow, v. low shear 5877
  - ultrasonic, continuous, theory and appl. 6512
  - electromag. torquemeter appl. 7483
- **Viscosity**
  - in solid polymers 1963
  - high polymer nitrocelluloses, Philippoff flow curves 2985
  - viscosity-time rel. for coking coals 3654
  - shear- and pressure-viscosity explanation, solids internal damping 5146
  - viscous flow, molecular interpret., review 6269
  - the rheological curve 8726
  - **gases**
    - cross-viscosity in air 73
    - transport props. relationships 79
    - effect in acoustic resonator 2270*
    - F, molec. effective dia. rel. 3017
    - viscosity effect in supersonic flow 3025
    - high press. meas., air appl. 3926
    - UF_6, 0–200° 4634
      - discrepancies 3016
    - det. simultaneously with spec. ht. and thermal conductivity 5896
    - binary mixtures, e.g. He–A 6536
    - D_2O vapour, ratio to H_2O 8272
    - He and A, oscillating disk meas. 8273
  - **liquids** see also *Lubrication; Superfluidity*
    - He I, pressure influence 217
    - F, rel. to temp. 1404
    - rigid macromolecule soln. rel. to freq. 1405
    - liq. A, rel. to thermal conductivity 1406
    - liquid crystallite theory appl. 1420
    - glass, meas., review 2226
    - water, new meas. method 2227
    - metallic, and supercooled polar, theory 2240
    - supercooled liq., discontinuities 2242
    - temp. var., integrating thermometer appl. 2425
    - shear temp. effect 2791
    - Na polyacrylate, intrinsic, rel. to salt conc. 2986
    - thixotropic matls., time-dependence meas. 2987
    - instantaneously thixotropic fluids, meas. 2988
    - sedimentation of glass spheres in water 3692
    - suspensions, rel. to vol. conc. 3693
    - stress tensor calc. 3897
    - as a material constant 3899
    - polystyrene/diethyl benzene, bulk 3900
    - He, quantum-mech. treatment 4058
    - solution, theory 4445
    - difference between ortho- and para-hydrogen 4633
    - UF_6, 65°–100° 4634
    - shear/bulk rel., conf. rep. 5315
    - conc. solns., high polymers 5316
    - polymer solutions 5317
      - rel. to mol. wt. 6302
    - secondary viscoelastic stress theory test 5871
    - non-Newtonian, temp. coeffs. at fixed shear 5873
    - shear rate effect, polystyrene fractions 5874
    - activation energy for viscous flow and short-range order 5875
    - polystyrene-decalin system 5876
    - dil. solns., coiling polymers, viscoelast. props. 6510
    - *ortho*- and *para*-D_2, low temp., difference 6511
    - diffusion theory 6532
    - rel. to velocity of sound 6557
    - of emulsions and suspensions 7255
    - temp. dependence eq. 7480–1
    - dynamic, rel. to rigidity 7482
    - rel. to damping of quartz oscillating in liq. 7533
    - polyisobutylene soln., shearing effect 8038
    - rel. to ultrasonic absorption 8293
    - macromolecules in suspension 8629
- **Visibility**
  - Luckiesh–Moss meter 101
  - stars and planets during twilight 2915
  - bibliography 4507
  - calculation, contrast relationships 5821
- **Vision** see also *Colour vision; Eye; Stereoscopy*
  - studies in physiological optics 1305, 2113, 5259–60, 6340, 8825–8
  - visual mechanism and quantal struct. of light 1306
  - Purkinje effect, low intensity luminance functions, correction 1309
  - threshold measurements of form, independence 1310
  - peripheral contrast thresholds for adapting field 1311
  - accommodation meas. by Purkinje images 2109
  - peripheral dark adaptation mechanisms 2110

Vision—*contd.*
  adaptation, influence of intermittent pre-adaptation 2111
  effect on threshold of multiple flashes 2112
  flicker expts., elec. analogue 2862
  brightness dissemination 2864
  foveal, effect of spot of light on sclera 4526
  peripheral glare source effect on apparent brightness 4527
  glare, effect and re-adaptation 4529
  line-shaped targets, thresholds 4530
  acuity during dark adaptation, thresholds 4531
  form of visual threshold data 5819
  effect of red light on dark adaptation 5820, 6339
  visibility calculation 5821
  size differences in halves of meridian 5822
  aniseikonia and Howard–Dolman test 5823
  disappearance of steadily fixated objects 6338
  response of eye to polarized light 8141
  light sensitivity and form perception in dark adaptation 8145
  steady and flashing signals, comparative effectiveness 8146
  metacontrast, factors causing 8147
Vitreous state
  glass flow at room temps. 1166
  glass, physical props. (book) 1321
  silica, i.r. reflection study 1519
  vitreous water, props. 1954
  bond differences from crystall. state 1955
  rel. to heat of solution, glasses 3274
  equilib. in glasses, irreversible approach 4401
  internal stresses due to disorder 4420
  amorphous solids, thermal conductivity, low temp. 4757
  resonance peak detection 5909
  polyisobutylene, transition from rubber-like state 7207–8
  surface devitrification, adsorbed gases effect 7966
  thermodynam. and kinetic props., glasses 8710
Volume measurement
  solids of revolution, by planimeter 2975
  small vol. changes, elec. recording 8248
Vortices see also *Cavitation; Turbulence*
 aerodynamics
  formation at shock tube open end 62
  method of ring formation 2233
  vortex street formation 2234
  generation by sound field 2266*
  in acoustic fields, surf. and vol. sources 5345
  rings, motion, existence theorem 5885
Water see also *Seawater*
  new thermal eq. of state 821
  pure, X-ray region absorpt. difference from seawater 880
  av. multiplicity, penetrating particles, cosmic ray showers 943
  β- and γ-induced Cherenkov radiation 1683
  from Lardarello borax spring, D_2O conc. 1854
  heavy water solns., D_2O conc. by float method 1855
  vitreous, props. 1954
  viscosity, new meas. method 2227
  heavy water mixtures, thermodiffusion expts. 2247
  u.v. emission due to ultrasonics 2267
  ultrasonic intensities, meas. app. 2290
  supercooled, freezing in glass 3236
   spontaneous nucleation theory 2243
   H_2O and D_2O, properties 5319
  saturated, thermodynamic properties 3280
  structure, press. effect invest. 3923
  thermal conductivity, theory 4051
  D_2O determination in low conc., density method 4630
  adsorbed, proton mag. reson. line width 4912
  D_2O high conc. prod., continuous electrolyt. method 4972
  sound absorption in fog 5344
  dielectric constant, calc. 6030
   abnormally low, in films 1607
  radiolysis, track effects 6298
  heavy-isotope-rich, by fractionation 7054
  isotopic fractionation, lab. still construct. 7056
  isotopic exchange with gaseous O, catalysis 7057
  in crystals, $CaSO_4$ study 7567
Water—*contd.*
  heavy, in nuclear reactors 7944
  H_2O, D_2O, nuclear reactor cooling data 7947
  ground state, self-consistent field calc. 8625
  snow water, radioactivity decay curve 8647
Water vapour see also *Humidity*
  effect on CO explosions 1208
  steam-carbon reactions, specific catalysts effect 2008
   metallic impurities effect 2009
  i.r. bands, line wavelengths 2348
  rotativity, Verdet const. det. 2392
  adsorption on porous glass, mechanism 2794
  effect on anodized Al elec. props. 3285
  refract. index at 9200 Mc/s 3455
  in atmosphere, definitions and specifications 3774
   ground layers, transport and distrib. 3772
   absorption band, statistical model 4510
  atm., absorpt. band, statist. model 4510
  proton energy losses 4874
  saturated, coeff. of fugacity 5447
  vapour pressure, −20 to 200°c, calc. 7625, 8359
  on silica gel, dielectric dispersion 7652
  D_2O and H_2O, viscosity ratio 8272
Wave mechanics see *Quantum theory, wave mechanics*
Waveguides see *Electromagnetic wave propagation, waveguides*
Waves see also *Acoustic waves; Elastic waves; Electromagnetic waves; Liquid waves; Seismic waves; Shock waves*
  "radiation principle" and wave eq. soln. 86
  wave eq. in hyperbolic space, soln. 1413
  particle wave propag., crystals 2207
  wave eq., formulae for numerical eq. 4553–4
  longitudinal magneto-hydrodynamic, props. 5339
  interference and group velocity demonstration 6575
Weather forecasting
  tornadoes identification by atmospherics 1303
Weighing see *Balances; Mass standards*
  magnetic, e.m. device 2224
  load meas. devices calibration 2977
  primary load standard 2978
Wetting see also *Contact angle; Heat of wetting*
  liquid metals on solid surfaces 6526
  rel. to methyl/methylene group in hydrocarbon surfaces 7491
Wind
  upper atmos., from acoust. propag. studies 1286
  stratosphere, acoust. propagation study 5258
  ionospheric wind systems 5237
   radio methods of study 2097
   ditto, long waves 4499
  effect on earth's axis of rotation 7410
  echo sounding with radiosonde 8122
  extreme heights, Kepler motion 8126
Wolfram
  bariated, thermionic emitter 296
  monocrystal, electron work function at some faces 885
  cold-worked, resistivity rel. to deformation temp. 1648
  oxide-coated filaments, thermionic emission 2519
  thoriated, X-ray study of cold work 2770
  exaggerated grain growth, orientation 2805
  boride, powder, superconductivity invest. 4107
  gas-coated surface, work function 4179
  adsorbed O film study 4452
  films, elec. conductivity phenomena 4797
  paramag. reson. absorpt. 5568
  surface barrier analysis by Schottky deviations 6120
  contamination of shadow-casting metal 6258
  thermal cond., low temp., mag. field 6698
  use in vac. u.v. photocell 6796
  as impurity in cathode base, Ba_3WO_6 formation 6910
  photoemission in predicted Schottky deviations region 7680
  magnetic struct., neutron diffract. study 8525
  high temp. mag. susceptibility 8558
Wolfram carbide
  powder, superconductivity invest. 4107
Wolfram oxides
  dielectric properties 207
  thermal and elec. props. and crystal. struct., high temp. 8796

- **Wood**
  - dielectric loss factor in h.f. range 1624
  - ignition by radiation 3249
- **Work function** see also *Electron emission*
  - BaS 294
  - lowering by free Ba in bariated W emitters 296
  - metals, factors influencing 297
  - Fowler–Nordheim eq. logarithmic plots, slope 884
  - electrons at some W monocrystal faces 885
  - photoelec., metals, effect of gases 3636
  - gas-coated W and Ag surfaces 4179
  - in contact p.d. calc. 5451–2
  - individual crystal surfaces 6078
  - I molecular crystal 6797
  - Si 6906
  - stored energy, calc. 7214
  - photoemission, Ag into AgCl, KBr, NaCl 7679
  - electron ejection from Ta by He^+, He^{++} and He_2^+ ions 7731
  - of thermionic emission, graphs for calc. 7747
  - Zn, abrasion effect 8442
- **Work hardening** see also *Cold working; Surface texture*
  - metals, survey 490
  - influence on creep and relaxation 493
  - annealed mild steel, static and dynam. conditions 1990
  - metal crystals, theory 1991
    - rel. to fine slip 7996
  - initial yield in Fe 2769
  - dislocation theory, review 3648
  - shear stress in dislocations array 3663
  - rel. to deformation in annealed polycrystall. Al 5141
  - Bauschinger effect in Cu, Al, Pb, Ni and Fe 7995
- **X-ray absorption** see also *X-ray spectra*
  - critical energies, table, for γ-ray meas. from β-spectra 414
  - pure and sea water coeff. differences, theoret. prediction 880
  - high-energy, cross-section for various elements 1089
  - alkali halide colour centres, 5°K, invest. 1251
  - selective, coupled wave-trains, pendulums analogy 3736
  - $M_{\text{IV, V}}$, anomaly in heavy elements 4826
  - thickness meas. up to 10 mm, appl. 4827
  - by a 980 : 222 glass 5940
  - amplitude of discontinuities 6830
  - in calcite near Bragg angle 7302
- **X-ray crystallography**
  - transmitted beam angular shift, near Bragg angle 537
  - conference report 1253
  - interatomic distances det., review 2813
  - development survey 3734
  - technology (book) 3735
  - acoust. wave elastic spectrum in AgCl, from scattering 4472
  - rotating-crystal methods, theory 4483
  - is interference double refraction possible? 4825
  - α–U orientation determination 5193
  - spottiness in powder diffract. lines, cause 5208
  - quantitative det. of preferred orientation 5783
  - equations for propagation through crystal plate 6577
  - international tables (book) 7299
  - LiF, large imperfect crystals, transmission studies 7301
  - transmission and absorpt. in calcite near Bragg angle 7302
  - textbook 8065
  - diamond elastic constants det., 8066
  - increased accuracy at low temp. 8075
  - mosaicity influence on polarized X-ray Bragg reflection 8780
  - **analytical apparatus**
    - apparatus for transforming photometric to blackening curves 102
    - for optical-diffraction method development 5209
    - ball-and-spoke model construction 5201
    - EDSAC appl. 7314
    - analogue recorder-playback computer 7315
    - optical diffraction instrument 7316–17
    - atom distrib., amorphous subst., photomech. method 8074
    - 3-dimensional coordinate demonstration model 8081
    - Fourier synthesis using Hollerith tabulator 8088
    - two new sets of strips 8787
    - Fourier summation on high-speed computer 8789
- **X-ray crystallography**—*contd.*
  - **analytical methods**
    - bundles of parallel chains displaced along axis 542
    - inequality methods, centrosymmetric partly known structures appl. 543
    - linear inequalities appl. 544
    - Harker–Kasper inequality, rel. to Okaya–Nitta 545
    - structure factor signs calc., algebraic method 1256
    - optical Fourier synthesis, improvements 1257
    - lattice disorientations det. 2074
    - divergent-beam photographs, line properties 2075
    - Fourier, interferometrical invest. 2077
    - protein crystallography, cut-off phenomena 2085
    - struct. det., some atom positions known 2819
    - struct. factor magnitude probability distrib. 2817–18
    - superlattice reflections, statist. treatment 2820
    - Bragg domain dimensions, polycrystall. powders 2821
    - $HNO_3.3H_2O$, Patterson function appl. 2831
    - polarization factor for inclined-beam photographs 3733
    - boehmite-hydrargillite ratio powder line intensities 3741
    - Cox and Shaw factor 3742
    - "zero" synthesis for Fourier refinements 3743
    - LiH ionic state det. not possible 4484
    - cylindrical Patterson syntheses 5212
    - crystall. organization parameters, direct. det. 5210
    - lattice sums, Evjen's method validity 5211
    - rutile and anatase parameters 5214
    - use of "convolution" operations 5781
    - struct. amplitudes, signs det. 5782
    - crystal symmetry det., possibility 6315
    - line breadth meas. 7308
    - non-cubic powder photos, graphical method 7309
    - proof of unambig. structure det. by "folding" 7310
    - orthogonal unit vector triplet 7311
    - corrections to earlier papers 7312
    - EDSAC appl. 7314
    - use of optical diffraction apparatus 7316–17
    - Buerger's image-seeking min. function, Fourier repres. 7318
    - Fourier synthesis, chem. appl. (book) 7319
    - diffraction patterns of polymer films 7976
    - international tables (book) 8064
    - unique determinations, Q_o function separation 8076
    - Q_o function calc. from intensity distrib. 8077
    - least-squares and steepest-descents methods, weighting 8078
      - centrosymmetric case, efficiency 8084
    - intensity probability distrib., hypersymmetric 8079
    - transmission factor estimation 8080
    - diffuse reflections from single crystals, interpret. 8082
    - pseudocentrosymmetric struct., statist. treatment of errors 8083
    - v. small body-centred cubic crystals, powder patterns 8085
    - 10 Å reflections, haemoglobin, strength calc. 8086
    - bond scattering factor approximation 8087
    - Fourier series maxima location 8089
    - Fourier series max. location, application to naphthalene 8090
    - optical representation of Fourier series 8091
    - "difference Patterson" extension for order-disorder solns. 8092
    - stoichiometric comp. from powder diagram, silica phosphate appl. 8111
    - low symmetry crystals, powder photog. interpret. 8782
    - phase determination, new methods 8783
    - oblique incidence and film-to-film factors 8784
    - Fourier transform of coiled-coil 8785
    - simple coiled-coils 8786
    - av. of $|F|^2$ for large interplanar spacing, meaning 8788
    - sign det. in Fourier anal. 8790
    - expt. and theory comparison, statist. test 8791
    - electron-density errors at special positions 8792
    - double Patterson function 8793
  - **apparatus** see also *X-ray monochromators; X-ray spectrometers*
    - low-temp. powder camera 538
    - line profiles det., achromatic arrangement 1255

A complete list of the Subject Headings will be found at the end of the Index.

X-ray crystallography—*contd.*
- **apparatus**—*contd.*
    - Norelco high-angle, in elastic strain meas. 1981
    - fine-focus X-ray tubes, camera 2064
        - and high-intensity monochromators 2065
        - for impulse work 2066
        - for back-reflection 2067
        - regulated focal spot 2068
        - long-line focus, appl. 2069
    - apparatus using high-intensity sources 2070
    - back-reflection, high-intensity camera 2071
        - microbeam camera, pre-selecting 7304
        - new camera 8072
    - camera-monochromator for polycrystals 2072
    - G.M. tube techniques 2073
    - for direct photography of reciprocal space 2814, 5204
    - gomiometer mountings, universal 2815
    - reflection goniometer for preferred orientations det. 2816
    - X-ray film granularity charac. 3737
    - G.M. counter, small single crystal intensities appl. 3738
    - crystal alignment on Weissenberg goniometer 3739
    - camera for texture mapping 3740
    - camera for low-angle diffract. studies 4482
    - diffraction cameras as optical goniometers 5191
    - Debye–Scherrer photog., v. low temp., camera 5205
    - low angle diffract. with long wavelengths 5206
    - G.M. counter diffraction spectrometer 5207
    - ground calcite crystals as gratings 6828
    - camera for preferred orientation meas., wires 7305
    - automatic, highly stable type 7307
    - diffraction tubes and cameras, opt. geom. conditions 8073
    - Norelco spectrometer, adaptation for fibre study 8718
    - X-ray shadow microscope 5509
- **structures** see *Crystal structure, molecular*
- **technique**
    - setting crystal by non-equatorial reflections 539
    - low absorpt. coeff. effect on measurements 540
    - powder diffract. lines, vertical divergence effect 541, 7313
        - struct. anal. at great distance 7975
    - Fe Neumann band, X-ray microbeam invest. 5736
    - effect of Soller slit, deformed crystals 5780
    - dynamic reflection curves, realization 6314
    - X-ray intensities meas., Weissenberg photographs 7306
    - temp. control in lattice spacing meas. 8071
    - diffraction tubes and cameras, opt. geom. conditions 8073
    - reference data for orienting quartz plates 8781

X-ray diffraction see also *X-ray scattering*
- development survey 3734
- quartz, surface treatment effect 4410
- low-angle, with long wavelengths 5206
- by deformed crystals, effect of Soller slit 5780
- by crystal plate, equations 6577
- by bent crystals, kinematic theory 8067–8
- scattering from hindered rotator 8069
- liquids, benzene, cyclohexanol 8265
- corpuscular theory 8779

X-ray examination of materials see also *Chemical analysis, X-ray; Radiography*
- suspended clay particle size det., low-angle diffraction 2793
- Leningrad conference 4409
- X-ray shadow microscope 5509
- KH_2PO_4 ferroelectric transform. 6756
- **liquids**
    - Sn, Bi and Pb, scattering curves method 2757
    - liq. O, atomic distrib. curve 3920–1
    - caramel sugar aq. solns. 4412
    - liquid He, scattering study 6250
    - diffraction in benzene and cyclohexanol 8265
- **microstructure**
    - stacking fault broadening in worked metals 486
    - metals 487
    - cokes, X-ray scatt. invest. 1970
    - polycrystall. metals deformed by rolling 2758
    - Sn, Zn, Pb, Cd, deformed by rolling 2759
    - thoriated W, cold worked 2770
    - zircon crystals damaged by α-rays 2828

X-ray examination of materials—*contd.*
- **microstructnre**—*contd.*
    - deformation bands in metallic crystals 3652
    - benzil, thermal diffuse scatt. 3750
    - bone, low-angle diffract. exam. 4411
    - fatigued metal struct. changes 4426
    - phys. chem. treatise (book) 5147
    - micro-beam tech., plant cells 5510
    - cellulose, elementary fibrils 5728
        - low-angle scattering study 5729
    - retained austenite transformation by fracture 5730
    - cold-worked solids, small-angle scatt. 6251
    - pyrophoric iron powders texture 7320
    - ferromag. powder particle size, line broadening method 7974
    - surface evenness, X-ray reflect. study 7977
    - steel, phase transformations 7978
    - natural ageing of Al alloys 7979
    - fibres, Norelco spectrometer adaptation 8718
    - residual strains in plastically deformed Fe 8723
- **molecular structure**
    - Ag–Sn–Hg (dental amalgam) setting process 549
    - amorphous Se 1179
    - silk, small-angle interferences rel. to wax content 1180
    - Pb/Sn system, molten, diffraction halos 1181
    - coals, scattering study 1969
    - ageing alloy, X-ray scatt. invest. 1971
    - fibres, viruses, small-angle X-ray scatt. study 1972
    - binary alloys, diffuse scatt. 2585
    - In–Pb alloys 2754
    - ClF_3 at −120°c 4265
    - glasses under v. high press. 4435
    - low-angle scatt., clustering evidence in Al–Zn alloys 5731
    - boron carbide 6249
    - quenched Fe alloys, interference line diffuseness 6273
    - line broadening by ppt. in Fe–Cu alloys 7201
    - X-ray diffract. stress-meas. method 7202
    - α-brass stacking faults meas. 7215
    - D absorpt. by La, diffract. study 7325
    - structural anal. at great distance 7975
    - polymer films 7976
    - friable cathode deposits of metals 7980
    - amorphous subst. atom-distrib., photomech. method 8074
    - Ag–Al alloys, Ag atom clustering 8102
    - CrSb, mag. mom. orientation 8357
    - magnetostriction invest. in Fe–Co mixed oxides 8603

X-ray measurement see also *Dosimetry*
- doses during diagnostic procedures 573
- high-energy, ionization method 1858
- calibration of radiation survey meters, etc. 2640
- photog. method, film characteristics 2643
- therapy dose computing device 2869
- depth dose, d.c. amplifier recording system 2870
- pulsed, ionization chamber saturation curve 3395
    - semi-empirical equations 4132
- dosage, film methods 4535
- half-value layer for oil-shielded tubes 6075
- fluorescent X-radn. anal. with proportional counters 6076
- vacuum CdS crystal cell dosemeter 6792
- calorimetric energy measurements 6830
- photovoltaic detector 6831
- scintillation counters (book) 6884
- by monitored G.M. counter, dead-time corrections elim. 8472
- the röntgen, errors in standard 8441

X-ray monochromators
- Al, double curvature, point focus 1254, 7303
- high-intensity, Soviet, review 2065
- camera-monochromator for polycrystal photog. 2072
- bent-crystal, charts giving charac. 8070

X-ray reflection
- pseudo-spherical mirrors to give magnification 4130
- quartz, effect of surface grinding 4410
- dynamic reflection curves with ideal crystals 6314
- search for better reflecting surface 7977
- diffuse, diamond elastic constants det. 8066
    - from single crystals, intensity 8082

A complete list of the Subject Headings will be found at the end of the Index.

X-ray scattering see also *Compton effect; X-ray diffraction*
- Compton profile prediction, graphite 345
- penetration and diffusion spatial distrib. calc. 878
- small-angle, from compact identical particles 881
  - by small particles, interference 1674
  - optical principles 4133
  - from cold-worked solids 6251
- coals study 1969
- diffuse, in binary alloys, theory 2585
  - thermal, from benzil, agreement with theory 3750
  - by short range order in Cu_3Au, theory 7294
- by fluids, theory 3004
- by dry and wet ramie 5729
- coherent, by atoms, form-factor 7047
- by thermal agitation, intensity 7300
- from hindered rotator 8069
- bond scattering factor calc. 8087
- incoherent, intensity expression 8440
- corpuscular theory of diffraction 8779

X-ray spectra see also *Chemical analysis, X-ray*
- spectral energy distribution in beam 258, 2474
  - semi-empirical eq. 4132
- in infinite homog. medium, calc. 878
- absorpt. and emission, in ionic crystals, theory 1672
- absorpt. edge structure rel. to emission spectra, review 5505
- **absorption**
  - *L*-spectra, Ag 879
    - Ni and Cu 4131
    - Ho 5496
    - Gd, Tm 5497
    - Eu, Tb 5498
  - transition probabilities, rel. to *K* absorpt., Li 1673
  - Pr^{59}, Nd^{60}, Sm^{62}, Eu^{63}, M_{IV} and M_V edges 2475
  - Mo L_{III} edge in $(NH_4)_2MoO_4$, $K_4Mo(CN)_8$, MoS_2 5502
  - edge fine struct. calc., absorpt. coeff jump. appl. 5504
  - edge structure, polar crystals, rel. to u.v. absorption 5506
    - transition element compds. 5507
    - ions in soln. 5508
    - main, calc. 6071
  - solids, fine struct. temp. dependence 6072
  - *K*-edges, heavy atoms, calc. 7046
- **emission**
  - graphite, interpretation 344
  - *K*-conversion lines, inherent half-width 1670
  - study of line widths 3343
  - RaD 4326
  - Ag, near u.v. absorpt. band det. 5495
  - line breadth and hyperfine structure 5500
  - *L* spectra, excited by internal conversion 5501
    - Ag emission 879
    - Ni and Cu 4131
    - Ho 5496
    - Gd and Tm 5497
    - Eu^{63} and Tb^{65} 5498
  - Tm, Ho, Tb, Gd, Eu weak emission 5499
  - *M*-spectra, rare earths, multiplicities 5503
  - 70 MeV, det. by electron pairs meas. 6827
  - RaE, ionization effect 7085
  - *K*-level fluorescence yield direct det. from line breadths 7706
  - Al, *K* spectrum in conductivity band region 7707
  - from protons (1·7–3 MeV) on Mo, Ag, Ta, Au, Pb 7920
    - **continuous**
  - from 70 MeV synchrotron 1669

-ray spectrometers see also *Gamma-ray spectrometers; X-ray crystallography, apparatus*
- ground calcite crystals as gratings 6828
- scintillation counters (book) 6884

-ray spectroscopy see also *X-ray crystallography; X-ray diffraction*
- information on energy state distrib., metals 5495

-ray tubes
- intensity limitations in a point source 259
- non-uniform filter giving flat isodose surface 1675
- fine focus, suitable camera 2064
  - Soviet review, heat dissipation 2065
  - impulse work appl. 2066
  - back-reflection appl. 2067

X-ray tubes—*contd.*
- fine focus—*contd.*
  - with regulated focal spot 2068
  - especially long focus, appl. 2069
  - for structural anal. 2070
  - for microradiography 2130
- device for vacuum irradiation 2104
- "midget," Be anode/window 3344
- travelling-wave accelerator for therapy 4135
- low-voltage Be-window, uses 5511
- oil-shielded, half-value layer meas. 6075
- overload device 7708

X-rays
- focusing by Gabor techniques, diffraction microscopy appl. 174
- soft, Pu^{239} radioactivity 1097
- from mesic atoms 1020
- from π-mesic atom 1021
- X-ray microscopy, scanning tech. 2476
- interference double refraction by crystals 4825
- hard, penetration and diffusion, polarization effects 4829
- X-ray shadow microscope 5509
- degree of homogeneity det. 6070
- propagation through crystal plate, equations 6577
- long pulses from betatron 6829
- human retina sensitivity, meas. 8143
- **effects** see also *Nuclear reactions, photons; Radiotherapy*
- organic molecules decomposition 516
- ang. correl. of photo- and Auger-electrons 1094
- on perchloric acid aq. solns. 1221
- *F*-centres formation in alk. halides 1250
- absorpt. bands induction, alk. earth compds. 1538
- Auger effect (book) 1898
- soft X-rays, on rabbit skin 2860
- 23 MeV, skin effect, biol. eval. 2861
- organic phosphors luminescence 3163
- action on NH_3 solution 3687
- decomposition of water, yield 3688
- on Na self-diffusion in NaCl 4406
- energy absorpt., human tissue, by photo-nuclear processes 4524
- decomposition of $KClO_4$ 5172
- betatron irradiation of ferrous sulphate solution 5174
- CdS elect. conductivity, wavelength for max. effect 7668
- on elect. conductivity of polyethylene 8398–9
- I prod. from KI soln. 8741
- Fe^{24} oxidation 8743
- **protection** see *Radiation protection*

Xenon
- radiation emitted in condensed discharges 250
- arc form of h.p. discharge 257
- ions, drift velocities in parent gas 292
- ultrasonic propagation, crit. temp. region 676
- h.p. arcs, plasma temps. det. 875
- 3rd virial coeff. 2259
- ionization probability curves near threshold 2510
- liq. vapour coexistence curve, critical region 3244
- vertical density distrib. near crit. pt. 3245
- ionization function for fast electrons 4861
- magnetic rotary power 7809

Zeeman effect
- single crystal, electric quadrupole interactions invest. 381
- microwave meas. apparatus 729
- He intercombination lines, theory 732
- atomic O *g*-factor study 1037
- heavy water 3133
- in Te spectra 3986
- in asymmetric-rotor molec. rotational spectra 3998
- forbidden components due to nuclear spin 5383
- As^{75}, nuclear mag. moment from 6180

Zeta-potential
- phosphor and glass, effect of Ba acetate with K_2SiO_3 3162
- TiO_2 sol, evaluation in presence of electrolytes 6811

Zinc
- vapour, in disch. lamp 176
- ores, new α-rays occurrence 399

Zinc—*contd.*
- single crystals, creep 1195–6, 6276
  - low temp. Hall effect 1793
  - chem. growth, oriented 2043
  - Debye heat wave dispersion 2063
  - from melt 4463
  - spherical, prep. 4464
  - dendritic growth 7274
  - Kramer and Russell effects 8442
  - cleavage fracture 8724
- u.s. wave propagation, velocity 1448
  - absorption 5918
- yield points, bending expts. 1988
  - rel. to dissolved N 1989
- deformed by rolling, X-ray study 2759
- accommodation kinking assoc. with twinning 2803
- Zn ammonium sulphate, anomalous spec. ht. 3270
- clean and oxide-coated, creep charac. 3669
- twin accommodation in plastic deformation 3709
- liq., interfacial tension with liq. Pb 5329
- thermal cond., low temp., mag. field 6698
- film formation, electron microscope study 7972
- friable cathode deposits, X-ray study 7980

Zinc ferrite
- Co–Zn ferrite, anomalous reson. absorpt. 4211
  - ferromagnetic resonance 4214
- Ni–Zn ferrite, ferromag. reson. 4212
  - magnetic viscosity 5575
  - (Ferroxcube-IV) dynam. elast. and magnetoelast. constants 7811
  - h.f. dispersion 8536
  - permeability tensor meas. 8548
  - Richter type after-effect 8571
  - ferromag. Faraday rotation, microwave 8598

Zinc ferrite—*contd.*
- Mn–Zn ferrite, ferromag. reson. 4214
  - Richter type after-effect 8571
  - spontaneous magnetization, temp. var. 8578
- chem. and magnetic struct., neutron diffract. stud 8526
- magnetic spectra 8535

Zinc bromide
- solution, use in radiation shield tanks 2637

Zinc oxide
- films, elec. conductivity, absorbed O influence 1632
- struct. defects, h.f. spectroscopy study 1640
- films on Zn crystal, structure 6307
- luminescence and "photo-dielectric" effect 7583

Zinc sulphide
- single crystals, photoconductivity 860
- nature of thermal colour change 758
- film, refract. index, effect of light 8308

Zircon
- treatment in centrifugal solar furnace 184

Zirconium
- superconducting props. below 1°K 864
- boride, powder, superconductivity invest. 4107
- thermal expansion 298°K–1600°K 7623
- thermal cond., low temp., mag. field 6698
- as structural material in nuclear reactors 8694

Zirconium carbide
- powder, superconductivity invest. 4107

Zoology
- squirming spherical bodies 649
- radioactive method for mosquito marking 2106
- self-propulsion of micro-organisms through liquids 3910
- porpoise sounds as sonar signals 4675

COLLECTED LIST OF SUBJECT INDEX HEADINGS

(EXCLUDING NAMES OF SUBSTANCES)

Headings followed by † were not used in 1953

MATHEMATICS

- Algebra†
- Equations
- Polynomials
- Geometry
- Transforms
- Vectors
- Tensors
- Matrices

- Transformations

- Series
- Fourier analysis
- Fourier series

- Functions
- Bessel functions

- Calculus
- Differential equations
    - relaxation methods
- Integrals
- Integral equations
- Fourier integrals
- Calculation
- Tables, mathematical
- Nomograms

- Group theory

- Graphs

- Calculating apparatus
    - analogue apparatus
    - differential analysers
    - digital computers
- Sliderules†

- Probability
- Random functions
- Fluctuations
- Errors, theory
- Statistical analysis
    - applications, counters

ASTRONOMY. ASTROPHYSICS. GEODESY

- Astronomical observations
- Astronomical instruments
- Errors
- Telescopes
- Celestial mechanics†

- Cosmogony
- Cosmology
- nterstellar matter
- Cosmic radiations, radio-frequency
- Cosmic rays

- Solar system
- Eclipses
- Orbits†
- Planets
- Earth
- Moon
- Meteors
- Comets

- Sun
    - magnetism
    - radiation
        - radio-frequency
- Sunspots
- Prominences
- Corona

- Stars
    - magnetism
    - magnitudes
    - radiation
- Novae
- Variable stars
- Binary stars
- Multiple stars
- Stellar clusters
- Stellar motion
- Parallax†
- Nebulae
- Galaxies

- Milky Way
- Astronautics
- Rockets

- Astronomical spectra
- Stellar structure
- Stellar composition
- Thermonuclear reactions
- Elements
    - origin
    - relative abundances

GEODESY

- Geodesy
- Earth
    - rotation
- Gravity
- Photogrammetry
- Cartography
- Navigation
- Time measurement

PHYSICS

- Physics
- Teaching
- ibliographies
- Collections of physical data
- Units
- Constants
- Dimensions
- quations, dimensional

- rrors, theory
- Measurement
- tandards
- aboratories
- aboratory apparatus
- nstruments
- cales, instrument†
- ecording

FUNDAMENTALS

- elativity
    - general
    - kinematical
    - special
    - unified field
- ravitation

- uantum theory
    - applications
    - radiation
    - *S*-matrix theory
    - spinor equations
    - wave mechanics
- undamental particles
- hotons

- Nuclear forces
- Collision processes
- Scattering, particles
- Constants, atomic
- Electron theory
- Field theory
    - electromagnetic field
    - interactions
        - meson-nucleon
        - particle/e.m. field
    - meson field
    - quantization
- Radiation, theory

- Statistical mechanics
- Indeterminacy
- Random processes
- Fluctuations
- Brownian movement
- Thermodynamics

GENERAL MECHANICS. MECHANICS OF SOLIDS

- Mechanics
- Kinematics
- Stress analysis
- Bending
- Torsion
- Gravitation
- Pendulums
- Pressure

- Dynamics
    - flexible bodies†
    - rigid bodies
- Velocity
- Acceleration†
- Coriolis forces
- Vibrations
- Vibrating bodies
- Damping
- Relaxation

- Rotating bodies
- Centrifuges
- Gyroscopes†
- Ballistics
- Rockets
- Impact
- Friction

MECHANICAL MEASUREMENTS

- Mechanical measurements
- Length measurement
- Altimeters
- Length standards
- Micrometry
- Interferometry
- Thickness measurement
- Optical lever
- Curvature measurement
- Particle size
- Area measurement†
- Surface measurement
- Volume measurement

COLLECTED LIST OF SUBJECT INDEX HEADINGS

Weighing
Mass standards
Balances
Density
Density measurement
Vapour pressure measurement
Angle measurement
Alignment†
Angular velocity measurement†
Stroboscopes
Velocity measurement
Acceleration measurement
Time measurement
Time interval measurement

Manometers
Anemometers
Pressure measurement
Force measurement
Torquemeters
Dynamometers
Strain gauges

MECHANICS OF FLUIDS

Hydrostatics
Density
Pressure
Elasticity, liquids
Compressibility
Hydrodynamics
  solid bodies in liquids
Viscosity
Viscosimeters
Superfluidity
Flow
Flowmeters
Pumps
Double refraction, flow
Turbulence
Vortices
Cavitation
Jets
Sprays
Lubrication
Diffusion
  thermal
Liquid waves
  surface
Liquid oscillations
Supercooling

CAPILLARITY

Capillarity
Surface energy
Surface tension
Surface tension measurement
Contact angle
Wetting
Heat of wetting
Bubbles
Foams
Emulsions
Films, liquid
Drops
Moisture

MOLECULAR THEORY OF LIQUIDS

Liquids
  structure
  theory
Equations of state
Association
Diffusion
  thermal
Osmotic pressure
Membranes
Filters
Solutions
Solubility
Heat of solution
Solid solutions
Liquid helium
Liquid crystals

GASES

Compressibility
Diffusion
  thermal
Viscosity
Density
Pressure
Conductivity, thermal
Vapour pressure
Vaporization
Association
Condensation
Liquefaction
Humidity
Moisture
Hygrometers

Aerodynamics
Aerofoils†
Flow
Flowmeters
Supersonic flow
Turbulence
Jets
Anemometers

Manometers
Barometers
Vacuum apparatus
Vacuum gauges
Vacuum pumps
Vacuum technique

MOLECULAR THEORY OF GASES

Kinetic theory
Collision processes
Molecules, intermolecular mechanics
Statistical mechanics
Association
Equations of state
Joule–Thomson effect

VIBRATIONS. ACOUSTICS

Vibrations
  excitation
  measurement
Waves
Seismographs
Vibrating bodies
Oscillations
Liquid oscillations
Piezoelectric oscillations
Damping
Relaxation

Acoustics
  musical
Acoustic waves
Acoustic wave propagation
Schlieren systems
Liquid helium, sound propagation
Döppler effect
Reflection
Refraction
Dispersion
Scattering
Interference
Interferometers
Interferometry
Diffraction
Absorption
Transmission

Elastic waves
Liquid waves
Seismic waves
Shock waves
Ultrasonics

Acoustic generators
Acoustic radiators
Acoustic transducers
Microphones
Hearing aids†

Acoustic impedance
Acoustic analysis
Scales, musical
Beats†
Resonators
Bells†
Tuning forks†

Acoustical measurements
Acoustical laboratories
Intensity measurement
Flames, sensitive
Stroboscopes
Velocity
Chemical effects

Musical instruments
Sound recording
Sound reproduction
Speech
Hearing
Ear

Atmospheric acoustics
Sound ranging
Architectural acoustics
Reverberation
Echo
Noise
Noise abatement

OPTICS. RADIATION

Light, electromagnetic theory
Photons
Cherenkov radiation
Light sources
Velocity
Döppler effect
Beats†
Photoelectricity
Radiation
  theory
Radiation pressure
Photophoresis
Radiation detectors
Bolometers
Thermopiles
Pyrometers
Emissivity

Photometry
  light sources†
Photometers
Illumination
Brightness
Spectrophotometry
Spectrophotometers
Densitometry

Optics, geometrical
Reflection
Mirrors
Optical lever
Optical images
Aberrations, optical
Resolving power
Lenses
  aspherical
  photographic
Prisms
Refraction
Refractive index
Refractive index measurement
Dispersion
Refractometers
Optical systems
Optical materials
Optical instrument testing
Schlieren systems

Spectroscopy
  light sources
Monochromators

COLLECTED LIST OF SUBJECT INDEX HEADINGS

- Spectrometers
  - accessories
  - microwave
- Spectrophotometry
- Spectrophotometers
- Spectra
- Raman spectra
- Stark effect
- Zeeman effect
- Spectral line breadth
- Döppler effect
- Spectrochemical analysis
- Temperature measurement
  - spectral methods
- Astronomical spectra
- Atmospheric spectra
- Atmospheric optics

- Absorption
- Transmision
- Transparency†
- Pleochroism
- Filters

- Luminescence
- Luminescence spectra
- Fluorescent screens

- Reflection
- Reflectivity
- Optical films

- nterference
- nterference fringes
- nterferometry
- nterferometers
- Diffraction
- Diffraction gratings
- Scattering
- Diffusion

- Polarized light
- Double refraction
  - flow
- Optical rotation
- Magneto-optical effects
- Polarimeters
- Photoelasticity
- Colour
  - theory
- Colorimetry
- Colour centres
- Colorimeters
- Vision
- Colour vision
- tereoscopy
- Visibility

- Optical instruments
- Optical instrument testing
- Optical materials
- Glass
- Telescopes
- Microscopes
  - phase-contrast
  - reflecting
- Microscopy
  - phase-contrast
- Mirrors
- ight sources
- rojectors

HEAT

- Heat
- hermal measurements
- Heat conduction
- onductivity, thermal
- eat transfer
- eat losses
- eat insulation†
- Temperature distribution
- adiation
- missivity
- onvection
- eating
- ooling

- Diffusion, thermal
- Thermal expansion
- Thermal transformations
- Phase transformations
- Heat of transformation
- Freezing
- Supercooling
- Melting
- Melting point
- Heat of fusion
- Boiling
- Boiling point
- Vaporization
- Evaporation
- Distillation
- Heat of vaporization
- Vapour pressure
- Vapour pressure measurement
- Humidity
- Sublimation
- Heat of sublimation
- Condensation
- Critical constants
- Heat of wetting

- Flames
- Combustion
- Heat of combustion†

- Low-temperature phenomena
- Superconductivity
- Superfluidity
- Liquid helium
  - sound propagation
- Low-temperature production
- Low-temperature technique
- Liquefaction, gases
- Joule–Thomson effect

- Temperature
- Temperature measurement
- Pyrometers
- Thermometers
  - resistance
- Thermostats
- Thermocouples
- Thermopiles

- Calorimetry
- Heat capacity
- Specific heat
- Heat of dissociation
- Latent heat

THERMODYNAMICS

- Thermodynamics
  - applications
- Thermodynamic properties
- Thermodynamic potential
- Entropy
- Equations of state
- Joule–Thomson effect

ELECTRICITY

- Electricity
- Electrical measurements
- Units, electrical
- Electrons
- Electron theory
- Fluctuations, electrical

ELECTROSTATICS. DIELECTRICS

- Electrostatics
- Electric fields
- Electric charge
- Space charge
- Contact potential

- Dielectrics
  - measurement
  - theory
- Dielectric constants
  - ferro-electrics
- Hysteresis
- Relaxation

- Electric strength
- Piezoelectricity
- Piezoelectric oscillations
- Electrostriction
- Electro-optical effects

ELECTRIC CONDUCTION. CURRENTS

- Conduction
- Conductivity
- Resistance
- Contact resistance
- Current
- Fluctuations, electrical
- Skin effect
- Semiconductors
- Rectifiers
- Superconductivity
- Photoelectricity
- Photoconductivity
- Photovoltaic effects†

- Thermoelectricity
- Thermocouples
- Thermopiles
- Electrokinetic effects
- Electrophoresis
- Zeta potential

ELECTRIC DISCHARGES

- Discharges
  - high-frequency
- Breakdown, electric
- Arcs
- Sparks
- Lightning
- Corona

X-RAYS

- X-rays
  - effects
- Bremsstrahlung
- Cherenkov radiation
- X-ray measurement
- Dosimetry
- Radiation monitoring
- X-ray absorption
- Radiation protection
- X-ray diffraction
- X-ray reflection
- X-ray scattering
- Compton effect
- X-ray spectra
- X-ray spectrometers
- X-ray spectroscopy
- X-ray monochromators
- X-ray tubes
- X-ray crystallography
- X-ray examination of materials
- Radiography
  - accessories
  - microradiography

CATHODE RAYS. POSITIVE RAYS

- Electron beams
  - effects
- Electrons
  - absorption
  - ionization
  - radiation
  - scattering
- Bremsstrahlung
- Cherenkov radiation
- Electron diffraction
- Electron optics
- Electron lenses
- Electron microscopy
- Electron microscopes
- Electron tubes
- Electron emission
  - secondary

- Ion beams
  - focusing
- Ion microscopes
- Ion sources

- Mass spectrometers
  - accessories
  - applications
- Particle accelerators
  - linear
  - orbital
- Range of particles

DISCHARGE TUBES. COUNTERS

- Gas discharge tubes
- Electron tubes
  - diodes
- Space charge
- Counters
  - crystal†
  - scintillation
  - operation technique
  - special applications
- Counters, accessories
- Counter tubes
  - construction
  - discharge mechanism
  - operation technique
  - special applications
- Counter tubes, accessories
- Statistical analysis, counters
- Counting circuits
- Ionization chambers
- Cloud chambers
- Particle track photography

IONIZATION. THERMIONICS

- Ions
  - recombination
- Ion velocity
- Ionization
- Ionization potential
- Dissociation

- Thermionic emission
- Ionization, surface
- Cathodes
- Work function
- Fluctuations, electrical

COSMIC RAYS

- Cosmic rays
  - absorption
  - apparatus
  - composition
  - alpha-particles
  - electrons
  - mesons
  - neutrons
  - photons
  - protons
  - effects
  - origin
  - showers and bursts
  - variations

MAGNETISM

- Magnetism
- Ferromagnetism
  - theory
- Paramagnetism
- Diamagnetism
- Magnets
- Compasses†
- Magnetic fields
- Magnetic field measurement
- Magnetic circuit†
- Magnetization
- Demagnetization
- Gyromagnetic effect
- Magnetic hysteresis, relaxation
- Magnetic measurements
- Magnetic properties of substances
- Paramagnetic resonance absorption
- Nuclear magnetic resonance

ELECTROMAGNETISM. ELECTRODYNAMICS

- Electrodynamics
- Electromagnetism
- Electromotive force†
- Inductance†
- Eddy currents†
- Field theory
- Light, electromagnetic theory
- Electromagnetic wave propagation
  - atmosphere
  - ionosphere
  - waveguides
- Electromagnetic waves
  - radiators
- Diffraction
- Reflection
- Refraction
- Scattering
- Absorption
- Electromagnetic oscillations
- Spectra, r.f.
- Spectrometers, microwave
- Interferometers
- Interferometry
- Cosmic radiations, r.f.
- Sun, radiation, r.f.
- Radiation, theory

MAGNETIC EFFECTS

- Magnetoelectric effects
- Hall effect
- Magnetomechanical effects
- Gyromagnetic effect
- Magnetostriction
- Magneto-optical effects
- Magnetothermal effects
- Magnetochemistry
- Zeeman effect
- Terrestrial magnetism

THEORY OF SOLID STATE

- Solids, theory
- Crystals, lattice mechanics
- Quantum theory

MOLECULAR STRUCTURE

- Molecules
  - configuration, dimensions
  - dissociation
  - excitation
  - intermolecular mechanics
  - internal mechanics
    - electronic structure
    - nuclear coupling
    - vibration, rotation
  - moments
  - relaxation
- Spectra
- Molecular beams
- Molecular volume
- Avogadro's number†

ATOMIC STRUCTURE. NUCLEUS. ISOTOPES

- Atoms
  - excitation
  - magnetic moment
  - structure
- Constants, atomic
- Atomic beams
- Ionization potential
- Nucleus
  - electric moment
  - energy levels
  - magnetic moment
  - spin
  - theory
- Nuclear excitation
- Nuclear magnetic resonance
- Spin-lattice coupling
- Nuclear forces
  - scattering
- Nuclear isomer separation†

- Atomic mass
- Atomic volume†
- Elements
  - origin
  - relative abundances
- Periodic system
- Isotopes
  - detection
  - relative abundance
- Mass spectra
- Isotope separation
- Mass spectrometers
  - accessories
  - application
- Tracers

RADIOACTIVITY. α-, β-, γ-RAYS

- Radioactivity
  - artificial production
  - dating
  - decay periods
  - decay schemes
  - electron capture
- Nuclear decay theory
- Radioactivity measurement
- Radioactive tracers
- Radiation protection
- Radiation monitoring
- Dosimetry

- Alpha-rays
  - absorption
  - angular distribution
  - detection, measurement
  - effects
  - scattering
- Alpha-ray spectra
- Alpha-ray spectrometers
- Beta-rays
  - absorption
  - effects
  - measurement
  - scattering
- Beta-ray spectra
- Beta-ray spectrometers
- Gamma-rays
  - absorption
  - angular distribution
  - detection, measurement
  - effects
  - internal conversion
  - scattering
- Gamma-ray spectra
- Gamma-ray spectrometers
- Electron pairs
- Electron annihilation
- Bremsstrahlung

NUCLEAR REACTIONS

- Nuclear excitation
- Nuclear isomer separation
- Nuclear forces
  - scattering
- Nuclear reactions
- Nuclear reactions, chemical effects
- Thermonuclear reactions
- Nuclear fission
  - products
- Nuclear fission reactors
- Nuclear spallation

- Counters
- Ionization chambers
- Cloud chambers
- Particle track photography
- Collision processes
- Range of particles
- Radiochemistry
- Chemical effects of radiations
- Biological effects of radiations
- Radiation monitoring
- Radiation protection

ATOM AND MOLECULE BEAMS. MESONS. NEUTRONS

- Atomic beams
- Molecular beams
- Fundamental particles
- Scattering
- Range of particles
- Particle accelerators

COLLECTED LIST OF SUBJECT INDEX HEADINGS

- eutrons
  - absorption
  - detection, measurement
  - diffusion
  - effects
  - polarization
  - production
  - reflection
  - refraction
  - scattering
    - proton-neutron
- eutron diffraction
- eutron spectrometers
- eutrino

- esons
  - absorption
  - decay
  - detection
  - effects
  - mass
  - production
  - scattering
- ield theory, meson field
- rotons
  - absorption
  - angular distribution
  - magnetic moment
  - negative†
  - production
  - scattering
- roton spectra
- euterons
  - scattering
- ritons

- Electrons
  - absorption
  - ionization
  - radiation
  - scattering
- Electron theory
- Electron pairs
- Electron annihilation

STRUCTURE OF SOLIDS

- Solids
  - structure
  - theory
- Density
- Plasticity
- Surface texture
- Fracture
- Brittleness
- Vitreous state
- Powders
- Granular structure
- Particle size
- Surface measurement
- Sintering
- Fibres
- Porosity
- Permeability
- Membranes
- Swelling
- Diffusion, solids
- Films, solid
- Solid solutions
- Electron diffraction examination
- Electron microscope examination
- X-ray examination of materials

ELASTICITY. STRENGTH. RHEOLOGY

- Elasticity
- Elastodynamics
- Elastic constants
- Photoelasticity
- Stress/strain relations
- Strain gauges
- Elastic limit†
- Elastic losses
- Elastic deformation
- Plastic deformation
- Plastic flow
- Plasticity
- Slip
- Compressibility
- Elastic fatigue
- Elastic relaxation
- Hysteresis
- Creep
- Mechanical strength
- Breaking strength
- Fracture
- Brittleness
- Adhesion
- Abrasion
- Hardness
- Work hardening
- Heat treatment
- Cold working
- Stresses, internal

- Rheology
- High-pressure effects
- Friction

PHYSICAL CHEMISTRY

- hase equilibrium

- xchanges, chemical
- eaction kinetics
- eaction rates
- hemical reactions
- eat of reaction
- eat of formation
- xplosions
- etonation
- ombustion
- eat of combustion†
- atalysis
- atalysts

- lectrochemistry
  - electrodes
- lectrolysis
  - electrodes
- onductivity, electrolytic
- ons, electrolytic
- on velocity, electrolytic
- lectrodeposition†
- issociation
- eat of dissociation
- H

- hemical effects of radiations
- hotochemistry
- uclear reactions, chemical effects
- olloids
- hixotropy

- Sols
- Gels
- Emulsions
- Suspensions
- Aerosols
- Foams
- Particle size
- Centrifuges
- Sedimentation, colloids
- Filters

- Adsorption
- Adsorbed layers
- Heat of adsorption
- Chromatography
- Phase transformations

- Atomic weight
- Molecular weight
- Molecular weight determination
- Atomic volume†
- Molecular volume
- Avogadro's number†
- Periodic system
- Elements
  - chemical properties†
  - origin
  - relative abundances
- Bonds
- Valency
- Chemical structure
  - optical, magnetic, etc., effects

- Stereochemistry†
- Magnetochemistry
- Polymers
- Polymerization
- Isomerism
- Isomerization

- Laboratory apparatus
- Pumps
- Disillation
- Filters
- Chemical reactions
- Chemical technology
- Oxidation
- Combustion
- Dissociation
- Explosions
- Detonation

- Chemical analysis
  - adsorption
  - conductimetric†
  - polarographic
  - positive rays
  - radioactive
  - X-rays
- Spectrochemical analysis
- Tracers
- Radioactive tracers
- Radiochemistry

CRYSTALLOGRAPHY

- rystallography
  - mathematical
- rystals
  - electron states
  - etching
  - faces
  - growth
  - imperfections
  - lattice mechanics
  - orientation
  - twinning
- Liquid crystals

- Crystal chemistry
- Crystal properties
  - electrical
  - magnetic
  - magneto-optic
  - mechanical
  - optical
  - thermal
- Colour centres
- Counters, crystal†
- Crystallization
- Heat of crystallization
- Polymorphism†

- Crystal structure
  - molecular
- X-ray crystallography
  - analytical methods
  - apparatus
  - technique
- X-ray examination of materials
- Electron diffraction crystallography
- Electron diffraction examination
- Electron microscope examination
- Neutron diffraction crystallography
- Mineralogy

GEOPHYSICS

Geophysics
Geodesy
Gravity

Seismology
Seismic waves
Seismographs
Microseisms

Terrestrial electricity
Terrestrial magnetism
Compasses
Magnetic storms

Earth
  age
  composition
  heat
  rotation
Radioactivity, dating
Geophysical prospecting

Oceanography
Tides
Seawater
Rivers
Glaciers

ATMOSPHERE. METEOROLOGY

Meteorology
Meteorological instruments
Hygrometers
Anemometers
Barometers
Weather forecasting

Atmosphere
  composition
  humidity
  movements
  radioactivity
  structure
  temperature
  thermodynamics
Atmospheric pressure
Humidity
Ionosphere
Ionosphere measuring apparatus
Ionization, atmosphere
Atmospheric disturbances
Thunderstorms
Magnetic storms

Sunlight
Sky brightness

Wind
Clouds

Snow
Ice
Rain
Rainfall
Fog
Condensation
Evaporation
Climatology

Atmospheric optics
Atmospheric spectra
Visibility
Night sky
Twilight
Atmospheric electricity
Aurora
Lightning
Atmospheric acoustics

BIOLOGY

Biology
Biophysics
Biological technique and instruments
Electrobiology
Biological effects of radiations
Zoology
Physiology
Viruses

Blood
Vision
Colour vision
Eye
Hearing
Ear
Speech

MEDICAL SCIENCE

Medical science
Pathology†
Electrotherapy†
Radiotherapy
Radiography
Hygiene
Radiation protection
Dosimetry

PHOTOGRAPHY

Photography
  applications
  colour
  high-speed
  infra-red
Particle track photography
Lenses, photographic

Cameras
Photographic light sources
Photographic materials
  sensitivity
Photographic process
  development

Photogrammetry
Densitometry
Radiography
  accessories
  microradiography
Cinematography
  high-speed

MATERIALS

Water
Ice
Glass
Glass-metal seals
Optical materials

Ceramics
Fibres
Paper†
Rubber
Plastics

Metallurgy
Metals
Alloys

Three publications of interest to readers of
'SCIENCE ABSTRACTS'

PHILIPS TECHNICAL REVIEW

A monthly publication dealing with technical problems relating to processes and investigations on Radio and Television, Lighting, Electronics, X-Ray and other allied subjects. 32 pages per issue. Size 11½″ x 8″. Published in English, French, German and Dutch. Subscription: 21/- per annum (post free).

PHILIPS RESEARCH REPORTS

A publication containing physical, chemical and technical papers, relating to the theoretical and experimental research work carried out in the various Philips laboratories. Philips Research Reports are published in volumes of six issues, each of about 80 pages. Size 9″ x 6″. Published in English and French. Subscription: 26/- per annum (post free).

COMMUNICATION NEWS

A publication, issued at varying intervals, on transmitters, transmitting valves, line telephony, line telegraphy, and automatic telephony. 32 pages per issue. Size 11½″ x 8″. Subscription: 14/- per four issues (post free).

PHILIPS

All enquiries regarding subscriptions should be addressed to:

PUBLICATIONS DEPARTMENT

PHILIPS ELECTRICAL LTD.

CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2

RADIO AND TELEVISION RECEIVERS • RADIOGRAMS AND RECORD PLAYERS • GRAMOPHONE RECORDS TUNGSTEN, FLUORESCENT BLENDED AND DISCHARGE LAMPS AND LIGHTING EQUIPMENT • 'PHILISHAVE' ELECTRIC DRY SHAVERS • 'PHOTOFLUX' FLASH-BULBS • HIGH FREQUENCY HEATING GENERATORS ARC AND RESISTANCE WELDING PLANT AND ELECTRODES • MAGNETIC FILTERS • BATTERY CHARGERS AND RECTIFIERS • SOUND AMPLIFYING INSTALLATIONS • CINEMA PROJECTORS • ELECTRONIC MEASURING INSTRUMENTS • ELECTRO-MEDICAL APPARATUS • X-RAY EQUIPMENT FOR ALL PURPOSES

METROVICK

SCIENTIFIC EQUIPMENT

- ELECTRON MICROSCOPES
- PHOSPHORUS PENTOXIDE VAPOUR TRAPS
- GLOW DISCHARGE VACUUM INDICATOR
- SPARK TEST SET
- OIL DIFFUSION PUMPS
  7 to 3,500 litres per sec.
- HIGH VACUUM VALVES
  ½″ to 20″ diameter, manually or power operated
- HIGH VACUUM PIPEWORK AND FLANGED JOINTS
- COLD TRAPS—CO_2—
  liquid air—refrigerated
- PIRANI VACUUM GAUGE
- IONISATION VACUUM GAUGE
- PIRANI VACUUM RELAYS
- COMPLETE HIGH VACUUM PUMPING PLANTS
- LIQUID FLOW RELAYS
- VACUUM FURNACES
- HIGH VACUUM COATING PLANT
  for aluminising, or for blooming optics
- VACUUM COLD WATER DEGASSING EQUIPMENT
- GEISLER TUBE
  showing how an electrical discharge is affected by varying degrees of vacuum
- HIGH SPEED RECURRENT WAVE-FORM MONITOR
- OIL STRIPPER UNITS
  for mechanical vacuum pumps
- PERMEAMETERS
- NUCLEAR PHYSICS EQUIPMENT
- CYCLOTRONS
- BETATRONS
- SYNCHROTRONS
- ROTARY VACUUM PUMPS
- SHADOW CASTING JIG
- EVAPORATION PLANT
  for shadow casting
- VACUUM DESICCATOR
  for drying plates
- FLUORESCENT VIEWING BOX
- PRECISION CURRENT STABILIZERS
- MASS SPECTROMETERS
- MAGNETIC CRACK DETECTORS
- MAGNETIC SORTING BRIDGE
- ELECTRON DIFFRACTION CAMERA
- CREEP TESTING EQUIPMENT
- H.V. LABORATORY EQUIPMENT
- LARGE ELECTROMAGNETS
- FREEZE DRYING EQUIPMENTS
- S. BAND TEST BENCH
- S. and X. BAND SPECTROMETER
- TRANSVA METER
  for measurement of kVA demand

The films "Research in Engineering" and "The Electron Microscope" are available to interested organizations.

Applications should be made to the Publicity Department, address below.

METROPOLITAN-VICKERS ELECTRICAL CO. LTD., TRAFFORD PARK, MANCHESTER 17
Member of the A.E.I. group of companies

METROVICK *Equipment for Science and Industry*

C/Z901

AUTHOR INDEX

December 1953

Abd El-Wahab Khalil, M., 8496
Abelès, F., 8343
Abragam, A., 8561
Abrahams, E., 8537
Ackermann, G., 8581
Adam, G. D., 8551
Adler, H., 8685
Ageno, M., 8470, 8686
Ahlers, N. H. E., 8312
Aitken, K. L., 8465
Akhiezer, A., 8223
Alexander, L., 8787
Allander, C. G., 8746
Allen, K. W., 8674
Allison, B. A., 8687
Almqvist, E., 8674
Alon, I., 8190
Alpert, D., 8274
Altenburg, K., 8267, 8287
Amaldi, E., 8495
Anders, T., 8294
Anderson, L. J., 8592
Anderson, P. W., 8514
Andrejewski, W., 8588
Andrus, J., 8575
Annis, M., 8483
Appalanarasimham, N., 8721
Argence, E., 8595
Arsac, J., 8190
Artman, J. O., 8548
Artom, M., 8327
Asaro, F., 8654
Ascoli, R., 8226
Azimov, S. A., 8497

Babcock, M. L., 8475
Bagdyk'yants, G. O., 8444
Bagley, E., 8271
Bahn, R., 8309
Baker, S. C., 8757
Barclay, C., 8781
Barkas, W. H., 8700
Barnes, C. B., 8377
Baroni, G., 8485
Barrett, W. A., 8454
Barrow, R. F., 8317
Barson, F., 8554
Bartell, L. S., 8449
Basinski, Z. S., 8765
Bassi, P., 8471, 8504
Bassompierre, A., 8620
Bates, C. J., 8649
Bates, D. R., 8619
Bates, L. F., 8549–50, 8573, 8579
Baumgartner, E., 8705
Beams, J. W., 8577
Becherer, G., 8713
Bechmann, R., 8759
Becker, U., 8191
Beers, Y., 8585
Belli, J. A., 8824
Bellomo, E., 8228
Bhagavantam, S., 8346
Bianchi, A. M., 8471, 8504
Bickford, L. R., Jr, 8533
Bierl, R., 8297
Bilby, B. A., 8766
Billig, E., 8404
Birnbaum, W., 8700
Bishop, R. E. D., 8278
Bitter, F., 8632
Blakemore, J. S., 8413
Blankenburg, G., 8402
Bleaney, B., 8559, 8566
Blet, G., 8303
Blum, E. J., 8188–9
Bode, F., 8352
Bonetti, A., 8506
Bonner, T. W., 8742
Bordoni, P. G., 8285
Borie, B., 8385
Borovinskiĭ, L. A., 8617
Bothe, W., 8486
Böttger, O., 8301, 8309
Bowden, F. P., 8735
Bowe, P. W. A., 8594
Bowen, H. J. M., 8803
Bowers, K. D., 8568
Boyle, A. J. F., 8679
Bozorth, R. M., 8529, 8534
Bracci, A., 8479, 8662
Brahmachary, R. L., 8207
Brandstätter, M., 8763
Brauer, P., 8329
Bray, R., 8421
Breazeale, F. B., 8718
Breckenridge, R. G., 8414
Breitling, G., 8715
Brewer, D. F., 8368, 8370
Breyer, B., 8756
Brezinšćak, M., 8201
Bridge, H., 8483
Brink, F., Jr, 8822
Brinkman, J. A., 8452
Brockway, L. O., 8449
Bronk, D. W., 8822
Brovetto, P., 8557
Brown, W. F., Jr, 8576
Brownell, G. L., 8820
Bruce, C. F., 8344
Brueckner, K. A., 8237
Bube, R. H., 8425
Bullen, K. E., 8805
Bunker, M. E., 8653
Burbidge, E. M., 8197
Burbidge, G. R., 8197
Burch, P. R. J., 8650
Burcham, J. N., 8753
Burgess, R. E., 8418
Burhorn, F., 8429
Burton, W. K., 8213
Bush, V., 8353
Butler, C. C., 8488
Button, J. C. E., 8754
Butuzov, V. P., 8358

Cadorin, D., 8508
Cagniard, L., 8806
Cahill, J. M., 8627
Caro, D. E., 8288, 8453
Carroll, P. K., 8316
Cavicchi, R. V., 8820
Ceccarelli, M., 8671
Cennamo, F., 8265
Chackett, K. F., 8673
Chagnon, P. R., 8707
Chalklin, F. C., 8306
Chamberlain, A. C., 8269
Chamberlain, J. W., 8195–6, 8818
Chandrasekhar, S., 8356
Chapiro, A., 8739
Chaplin, R., 8412
Chapman, P. R., 8412
Chari, S. S., 8284, 8291–2
Charlesby, A., 8740, 8751
Charpak, G., 8659
Chatel, S., 8260
Chaume, G., 8830
Chhapgar, A. F., 8279, 8283, 8293
Chiba, R., 8683
Chomse, H., 8333
Christian, J. W., 8765
Christorazum, A. A., 8631
Cini, M., 8217
Clarebrough, L. M., 8722
Clark, C. A., 8578
Clark, L. B., Sr, 8468
Clarke, E. N., 8407
Clementel, E., 8498
Cohen, B. L., 8455
Cole, R. H., 8391
Colli, L., 8466
Connelly, C. M., 8822
Cook, A. H., 8246
Cook, C. J., 8454
Cooper, P. N., 8459–60
Corey, R. B., 8630
Corliss, L. M., 8526
Cortellessa, G., 8470, 8686
Cortini, G., 8485
Cottrell, A. H., 8612
Courant, H., 8483
Cowan, G. R., 8731–3
Crawford, B., Jr, 8731–3
Cresti, M., 8474, 8494
Crick, F. H. C., 8785–6
Crittenden, E. C., Jr, 8544
Crocker, V. S., 8459–60
Cross, L. E., 8392
Cruickshank, D. W. J., 8791–2
Cunliffe, A., 8241
Currie, M. R., 8587

Dalitz, R. H., 8702
Dallaporta, N., 8506
Damon, R. W., 8538
Darbyshire, J., 8177
Dascola, G., 8506
Daunt, J. G., 8377
Davies, A. J., 8754
Davies, J. G., 8248
Davies, R. O., 8710
Davison, S., 8649
Davisson, C. J., 8577
Dayal, B., 8721
Dazia, T., 8683
De Barr, A. E., 8413
de Groot, S. R., 8386
De Keyser, W. L., 8249
de Klerk, D., 8376
de Laboulaye, H., 8689
Delavault, H., 8355
Demichelis, F., 8200, 8663
Denisse, J. F., 8188
Deruyttere, A. E., 8724
d'Espagnat, B., 8699
Deutscher, K., 8436
Deutschmann, M., 8509
Devey, G. B. [Transl.], 8298
Devons, S., 8640
de Waele, A., 8726
Dewan, J. T., 8674
Dewhirst, D. W., 8185
Dijkstra, L. J., 8604
Dingle, R. B., 8511
Dissanaike, G. A., 8477
Ditchburn, R. W., 8325
Dixon, C. E., 8452
Dodd, K. N., 8198
Donnet, J. B., 8628–9
Douglas, A. E., 8315
Dousmanis, G. C., 8622
Dowd, J. J., 8404
Downie, A., 8732
Drubba, H., 8300
Duclaux, J.-P. E., 8359
Dufour, C., 8450
DuMond, J. W. M., 8665
Dupouy-Camet, C., 8307
Duryee, W. R., 8353

Eastabrook, J. N., 8472
Eberle, J., 8349
Eckardt, A., 8282
Edels, H., 8437
Edmonds, A. R., 8636
Egelstaff, P. A., 8708
Ehrenberg, L., 8743
Eisenhart, L. P., 8175
Elliot, J. F., 8554
Elliott, A., 8752
Elliott, R. J., 8562
Ellison, F. O., 8625
Elton, L. R. B., 8448
El-Wahab Khalil, M. Abd, 8496
Emslie, A. G., 8310–11
Erdmann, K., 8829
Eshelby, J. D., 8767

Facchini, U., 8466, 8662
Falk, G., 8211
Falkenhagen, H., 8737
Farmer, F. T., 8398
Farmer, M. H., 8275
Faust, W. R., 8687
Fenwick, M., 8643
Ferguson, T. B., 8821
Ferraro, V. C. A., 8817
Ferroni, S., 8557, 8661
Fesenko, E. G., 8761
Findlay, V. R., 8344
Fine, M. E., 8569
Fogg, P. G. T., 8289
Forrez, G., 8270
Fortrat, M. R., 8728
Foster, J. S., Jr, 8463
Fowler, J. F., 8398
Fowler, W. B., 8688
Fox, L. L., 8380
Franchetti, S., 8491
Françon, M., 8351
Freedman, H. P., 8312
Fremlin, J. H., 8673
Friedlander, F. G., 8280
Frönsdal, C., 8236
Frühling, H.-G., 8302
Fry, W. F., 8696–7
Fubini, S., 8235
Fujiki, Y., 8717
Fujimoto, Y., 8484
Fujita, H., 8266
Fukushima, E., 8711–12
Fukuyama, I., 8362
Furst, M., 8340
Furutsu, K., 8590
Fuson, N., 8748

Galt, J. K., 8575
Ganz, D., 8647
Ganzhorn, K., 8611
Garelli, C. M., 8327
Garwin, R. L., 8473
Geĭlikman, B. T., 8233
Geisler, A. H., 8545
Geller, M., 8397
Gentile, C., 8327
Genzel, L., 8354
Gerritsen, A. N., 8609
Gerthsen, C., 8480
Gevers, M., 8536
Ghosh, A., 8667
Gilford, S. R., 8821
Gindsberg, J., 8585
Giovanelli, R. G., 8305
Glauberman, A. E., 8613
Gleĭzer, M. D., 8816
Goes, M. L., 8655
Goldblith, S. S., 8649
Goldman, J. E., 8516
Goldstein, H., 8706
Gol'tsev, V. D., 8319
Gonikberg, M. G., 8358
Goodman, C., 8676
Goodwin, L. K., 8464
Gordon, D. I., 8531
Gorter, C. J., 8539–40
Gossard, E. E., 8592
Gossick, B. R., 8421
Gossick, B. W., 8422
Gould, R. N., 8241
Gow, J. D., 8463
Goward, F. K., 8657

AUTHOR INDEX—*continued*

Granier-Mayence, J., 8323
Green, L. L., 8682
Greenough, G. B., 8724
Gregg, D. E., 8821
Gregory, C., 8216
Grien, H., 8429
Griffith, R. H., 8412
Grosof, G. M., 8641
Gross, E. P., 8397
Grunberg, L., 8442
Guggenheim, E. A., 8400
Guillaud, C., 8574, 8603
Guillaume, J., 8830
Gullikson, C. W., 8337
Gunn, J. B., 8413
Günther, N., 8825–8
Guth, E., 8244
Gutowsky, H. S., 8633

Haardick, H., 8716
Haase, R., 8268
Hahn, B., 8339
Haigh, C., 8435
Haken, H., 8607
Hälg, W., 8685
Hall, H. O., 8762
Hamilton, J., 8218
Hanks, P. A., 8289
Harang, L., 8814
Hargreaves, M. E., 8722
Harker, D., 8788
Harley, J. H., 8648
Harris, C. W., 8244
Hart, A., 8549
Hashimoto, H., 8445
Hashitsume, N., 8243
Hassion, F. X., 8391
Hastings, J. A., 8353
Hastings, J. M., 8526
Haug, P., 8324
Havas, P., 8698
Haxel, O., 8646
Hayashi, I., 8567
Heavens, O. S., 8764
Hedrick, L. C., 8584
Heer, C. V., 8377
Heidenreich, R. D., 8556
Heidmann, J., 8672
Heikes, R. R., 8521
Henry, W. E., 8560
Herforth, L., 8758
Herpin, A., 8450
Herr, W., 8645
Hershberger, W. D., 8564
Hibbard, L. U., 8453
Hibberd, F. H., 8596
Hill, R. D., 8669
Hill, R. W., 8367
Hlavatý, V., 8202–3
Hobson, R. M., 8481
Hodgson, P. E., 8680
Hoffman, R. W., 8544
Hoffmann, W., 8333
Hogan, C. L., 8598
Hollis-Hallett, A. C., 8374
Holshouser, D. F., 8475
Honl, H., 8589
Hopper, H. G., 8575
Hopper, V. D., 8810
Horowitz, J., 8561
Hosler, W. R., 8414
Hoyle, F., 8186
Hoyt, H. C., 8665
Huber, P., 8685, 8705
Hudson, R. P., 8376
Hughes, D. J., 8690
Hughes, J. W., 8472
Hughes, V., 8642
Hughes, V. W., 8641
Hume-Rothery, W., 8795
Hunter, S. C., 8612
Hurst, G. S., 8467
Hutchinson, C. A., Jr, 8563
Hutchinson, T. S., 8782
Huybrechts, M., 8451

Ibrahim, A. A. K., 8253
Iitaka, Y., 8393
Inall, E. K., 8679
Inuishi, Y., 8417
Irvin, B., 8718
Ishiguro, K., 8308
Ishikawa, G., 8813
Ismailzade, I. G., 8799
Iwata, G., 8458
Iwayanagi, H., 8390

Jaccard, C., 8387
Jackson, R., 8708
Jacobs, J. A., 8807
Jarmie, N., 8701
Jelatis, J. G., 8397
Jessop, H. T., 8347
Johnson, E. R., 8741
Johnson, R. E., 8729
Jones, D. S., 8256
Jones, F. Llewellyn, 8427
Jones, G. A., 8638
Jones, G. O., 8710
Josien, M.-L., 8748

Kabiel, A. M., 8253
Kallmann, H., 8340
Kambe, D., 8436
Kan, B., 8649
Kanda, T., 8565
Kannangara, M. L. T., 8499
Känzig, W., 8387
Kappler, E., 8723
Karel, M., 8649
Kastner, J., 8667
Kats, M. L., 8328
Katterbach, K., 8644
Kaufmann, A. R., 8582
Kawaguchi, M., 8232
Kawamura, H., 8439
Kaya, S., 8530
Kayas, G., 8304
Keane, A., 8720
Kelbg, G., 8737
Keller, G., 8643
Kemp, L. A. W., 8441
Khalil, M. Abd El-Wahab, 8496
Kiepenheuer, K. O., 8187
Kilmister, C. W., 8209
Kind, A., 8634
King, G. W., 8310–11
King, R. F., 8258
Kinzinger, E., 8447
Kip, A. F., 8555
Kippenhahn, R., 8194
Kirby, P. L., 8281
Kitaigorodskii, A. I., 8798
Kittel, C., 8537
Klepikov, N. P., 8224
Kloepper, R. M., 8666
Koch, R., 8768
Koehler, W. C., 8527
Köhler, U., 8809
Kojima, S., 8621
Kokhanenko, P. N., 8319
Kolb, W., 8480
Kondo, S.-I., 8775
Korringa, J., 8609
Kortüm, G., 8324, 8736
Kostryukova, M. O., 8384
Kotani, M., 8618
Kovačič, E., 8252
Kozakevitch, P., 8260
Kozhin, V. M., 8798
Krebs, H., 8770
Kriessman, C. J., 8558
Krishna Rao, K. V., 8346
Krogh-Moe, J., 8783
Kroll, W., 8772
Kronig, R., 8375
Krumbiegel, J., 8758
Kubo, R., 8518

Lacam, A., 8286
Lacey, R. F., 8632
Ladacki, M., 8749
Laird, R. K., 8317
Lambert, J. D., 8289
Lampert, M. A., 8432
Landmark, B., 8814
Landsberg, P. T., 8401
Landt, E., 8727
Lane, P. E., 8434
Lapsley, A. C., 8469
Legvold, S., 8554
Lehovec, K., 8768
Leifer, H. N., 8564
Lenz, F., 8440
Leontic, B., 8703
Levin, J. S., 8690
Levy, S., 8602
Lewis, G. L., 8726
Lichtin, N. N., 8251
Lidiard, A. B., 8608
Lighthill, M. J., 8295
Lin, S. T., 8582
Lindhard, J., 8394
Lindig, O., 8282
Lindsay, P. A., 8476
Link, W. T., 8338
Linz, A., Jr, 8389
Lion, A., 8263
Lisenkov, A. A., 8378
Livingston, R., 8321
Lochte-Holtgreven, W., 8428–9
Logan, R. A., 8405
Loinger, A., 8227–8
Long, E., 8369
Long, F. A., 8271
Longuet-Higgins, M. S., 8259
Loria, A., 8474, 8494
Lösche, A., 8264
Lundquist, S., 8456
Lüst, R., 8583
Lüty, F., 8777
Lyubimov, A. L., 8497

McClelland, C. L., 8676
McClure, R. E., 8633
McCombie, C. W., 8199
McCrea, W. H., 8183
McCulloch, R. K., 8435
MacDonald, A., 8768
McGuire, T. R., 8541
McLean, D., 8275, 8725
McPhillips, J., 8756
Madansky, L., 8707
Maebe, J., 8745
Magnus, W., 8296
Maita, J. P., 8410
Majumdar, R. C., 8222, 8804
Malvano, R., 8663
Malvicini, A., 8662
Manduchi, C., 8504
Mansfield, R., 8411
Mariens, P., 8270
Marr, G. V., 8325
Marshall, G., 8573
Marshall, J., 8677
Marshall, L., 8677
Marterstock, J., 8302
Martin, L. H., 8288
Martius, U. M., 8604
Marzetta, L. A., 8821
Mason, W. P., 8601
Masters, J. I., 8744
Masuda, Y., 8565
Matarrese, L. M., 8546
Mathews, P. M., 8181
Mathieu-Sicaud, A., 8830
Matossi, F., 8330
Matsumato, M., 8775
Maxwell, L. R., 8541
Mayants, L. S., 8616
Mayburg, S., 8409
Mayer, G., 8408
Mayer, S. W., 8789
Mayne, K. I., 8510
Mazenko, J. J., 8415
Mazur, P., 8386
Meechan, C. J., 8452
Mehl, C. R., 8698
Meier, R., 8320, 8704
Meiklejohn, W. H., 8543
Meinnel, J., 8774
Mendelssohn, K., 8368, 8370
Menzies, A. C., 8336
Mercier, R., 8255
Merlin, M., 8506
Messel, H., 8493
Meyer, I., 8829
Meyer, L., 8369
Meyer, L. H., 8633
Meyer, P., 8668
Mezzetti, L., 8495
Michel, L., 8215
Miessner, G., 8776, 8778
Millar, D. D., 8487
Miller, E. C., 8694
Miller, K. S., 8586
Milone, A., 8485
Milone, C., 8245
Mitra, A. N., 8222
Mohr, T., 8382
Mönch, G. C., 8301, 8381
Morellet, D., 8304
Morinaga, H., 8696
Morita, M., 8658, 8660
Moriyama, M., 8388
Morpurgo, G., 8635
Morrison, R. B., 8819
Moses, H. E., 8229
Mueller, C., 8627
Mugibayashi, N., 8232
Muller, N., 8624
Mulliken, R. S., 8624
Munro, G. H., 8811
Murgai, M. P., 8734
Muroga, S., 8182
Muto, T., 8771

Nabarro, F. R. N., 8612
Nakamura, T., 8618
Nedzel, A. V., 8677
Néel, L., 8532, 8580
Neilsen, H., 8815
Nesbitt, E. A., 8556
Netushil, A. V., 8378
Nieke, H., 8403
Nielsen, J. R., 8337
Nifontoff, N., 8419
Nightingale, R. E., 8733
Nishijima, K., 8214
Nitzsche, K., 8282
Norrish, R. G. W., 8342
Nucci, P., 8178
Nukasawa, K., 8623
Nuovo, M., 8285
Nye, J. F., 8808

O'Brien, J. P., 8824
Ogawa, S., 8489, 8621
Ogg, R. A., Jr, 8732
Ogi, M., 8610
Ohno, K., 8618
Okun', L. B., 8670
Olbert, S., 8483
Oliver, D. J., 8578
Oliver, N. J., 8818
Olkowsky, J., 8689
Ôno, K., 8567
Ookawa, A., 8711–12
Opechowski, W., 8597
Ore, A., 8236
Owen, G. E., 8707

Pack, D. C., 8184
Packham, R. C. G., 8380
Page, D. I., 8487
Palmer, G. H., 8465
Palmer, P. L., 8380
Pancholy, M., 8279
Paneth, F. A., 8510
Papapetrou, A., 8206
Parker, E. N., 8192
Parlin, R. B., 8755

AUTHOR INDEX—*continued*

Parthasarathy, S., 8279, 8283–4, 8291–3
Pasheva, Z. P., 8797
Pastor, R. C., 8563
Pateman, J. E., 8179
Pauling, L., 8519, 8630
Payne, D., 8247
Peiser, H. S., 8831
Pekeris, C. L., 8373
Pellé, M., 8709
Pepper, T. P., 8674
Péraldi, R., 8261
Perlman, I., 8654
Perry, K. E., 8820
Perucca, E., 8200, 8383
Peter, M., 8387
Petralia, S., 8290
Pfotzer, G., 8492
Philippot, J., 8371
Phillips, H. B., 8332
Pick, H., 8778
Pickett, L. W., 8624
Polder, D., 8570
Polovin, R., 8223
Pomeranchuk, I. Ya., 8684
Poots, G., 8619
Porter, G., 8342
Post, H. R., 8637
Potts, R. B., 8493
Powell, R. W., 8396
Preining, O., 8606
Prestwood, R. J., 8653
Preuss, H., 8615
Price, R. E., 8812
Price, W. L., 8420
Priester, W., 8193
Prigogine, I., 8371
Proctor, B. E., 8649
Prowse, W. A., 8434
Pugh, E. M., 8599
Puppi, G., 8498

Quercia, I. F., 8501
Querzoli, R., 8470, 8686
Qurashi, M. M., 8784

Rado, G. T., 8535
Raether, H., 8430
Rahman, A., 8760
Raïevski, V., 8691, 8709
Ramachandran, G. N., 8780
Ramaiah, N. A., 8433
Ramakrishna, A., 8180–1
Ramaseshan, S., 8780
Ramsauer, R., 8714
Ramsey, N. W., 8399
Rathenau, G. W., 8542
Raychaudhuri, A. K., 8204
Reasbeck, P., 8510
Redfield, A. G., 8600
Reimer, L., 8723
Reinecke, L.-H., 8614
Remy, E., 8647
Repp, G. W., 8701
Ricamo, R., 8704
Richter, B., 8632
Richter, H., 8715
Rietveld, A. O., 8273
Rispoli, B., 8501
Ritchie, R. H., 8467
Roberts, L. D., 8385
Robertson, A. P., 8791
Rochester, G. D., 8488
Roesler, F. C., 8605
Rollett, J. S., 8792
Romand, J., 8323
Romers, C., 8800
Ross, M., 8740
Rossi, B., 8483
Rossman, M. G., 8360
Rostoker, N., 8599
Rotenberg, D., 8732
Rotondi, L., 8409
Rottgardt, K. H. J., 8331
Rowlingson, J. S., 8272
Roy, R. R., 8655
Rüchardt, H., 8322
Rudstam, S. G., 8681
Rust, H. H., 8250, 8300
Rutgers, G. A. W., 8431
Rutherglen, J. G., 8678
Ruyssen, R., 8745
Ryshkova, K. P., 8497
Rzewuski, J., 8225, 8234

Saeland, E., 8743
Sage, M., 8260, 8603
Sailer, H., 8205
Salam, A., 8239
Salpeter, E. E., 8238
Sanders, T. M., Jr, 8622
Saroléa, L., 8773
Sartain, C. C., 8385
Sato, R., 8719
Saunders, J. W., Jr, 8824
Sawada, S., 8796
Sayers, D., 8316
Sayre, D., 8793
Scanlon, J. C., 8818
Scanlon, J. P., 8682
Scarsi, L., 8485
Schaefer, C., 8349
Scherr, C. W., 8626
Scherrer, P., 8704
Scherrer, V. E., 8687
Scheuble, W., 8747
Schilling, P., 8428
Schlieder, S., 8668
Schonberg, M., 8220–1, 8451
Schopper, H., 8395
Schrader, R., 8581
Schreuer, E., 8299
Schubart, G., 8402
Schwarz, R. J., 8586
Schwertz, F. A., 8415
Schwinger, J., 8213
Seed, J., 8675
Seeger, K., 8482
Seidel, P., 8333
Sekido, Y., 8500
Sells, R. L., 8244
Setti, R. L., 8505
Shadle, O. W., 8821
Shalek, R. J., 8742
Shenstone, A. G., 8313, 8345
Sherry, N. P. R., 8579
Shimauchi, A., 8621
Shimizu, M., 8515
Shmushkevich, I. M., 8684
Shrikantia, G. S., 8499
Shull, C. G., 8525
Shull, H., 8625
Shutt, R. P., 8688
Simon, A., 8581
Sims, G. D., 8476
Singh, H., 8283
Singh, K., 8735
Singh, L., 8335
Sittkus, A., 8647
Skornyakov, G. V., 8695
Slater, C. H. W., 8379
Slater, J. C., 8522
Sloane, R. H., 8481
Smallman, R. E., 8794
Smart, J. S., 8517
Smirnov, S. P., 8358
Smit, J., 8570
Smith, E. K., Jr, 8593
Smith, F. M., 8700
Smith, R. A., 8424
Smith, R. D., 8678
Smith, W. L., 8687
Smoluchowski, R., 8513
Snow, A. I., 8357
Sogn, L. T., 8781
Sokolov, A. A., 8224
Sokolov, S. Y., 8298
Soled, J., 8768
Soma, J., 8610
Sonnenschein, R. R., 8823
Spedding, F. H., 8554
Spohr, D. A., 8426
Squire, C. F., 8366
Srinivasan, D., 8284, 8291–2
Stableford, W. H., 8347
Standley, K. J., 8551
Starner, J. W., 8653
Stearns, C., 8768
Stein, S. N., 8823
Steinberg, J. L., 8188, 8190
Stephens, W. E., 8457
Stephenson, G., 8209
Sternheimer, R. M., 8443
Stevens, K. W. H., 8512, 8566
Stoner, E. C., 8520
Stoppini, G., 8495
Stout, J. W., 8546
Straubel, H., 8262
Strelkov, P. G., 8384
Stroffolini, R., 8507
Stueckelberg, E. C. G., 8208
Subrahmanyam, N., 8433
Sucksmith, W., 8552, 8578
Suganuma, R., 8717
Suita, T., 8438
Suwa, S., 8314
Swank, R. K., 8332
Székely, A., 8462
Szwarc, M., 8749–50

Tait, R. I., 8306
Takabayasi, T., 8242
Takahashi, Y., 8231
Takemoto, S., 8683
Tamura, T., 8484
Tanaka, K., 8362, 8445
Tanaka, Y., 8318
Tanenbaum, M., 8410
Tannenwald, P. E., 8548
Tarkhova, T. N., 8797
Taylor, W., 8730
ter Haar, D., 8277, 8372
ter Horst, D. T. J., 8431
Ternov, I. M., 8224
Tesche, O. A., 8790
Thedieck, R., 8416
Therraux, C., 8490
Thewlis, J., 8782
Thomas, G. R., 8251
Thomas, J. P., 8450
Thompson, J. E., 8578
Thomson, J., 8461
Thorndike, A. M., 8688
Thrush, B. A., 8342
Tolhoek, H. A., 8386
Tomasini, G., 8505
Tomlinson, T. B., 8420
Tomono, M., 8423
Torpey, W. A., 8276
Touschek, B. F., 8213
Townes, C. H., 8622
Trefall, H., 8502
Trevoy, D. J., 8276
Trueblood, K. N., 8789
Truell, R., 8602
Tsukada, K., 8621
Trumpy, B., 8502–3
Tucker, M. J., 8177
Turnbull, D. T., 8326
Tzara, C., 8689

Ueta, M., 8334
Ulmer, K., 8446
Umezawa, H., 8231
Ursell, F., 8257

Vachaspati, 8212
Van Den Berg, G. J., 8273
van der Burgt, C. M., 8536
Vanderhaege, G., 8485
van der Heide, H., 8571
van Dranen, J., 8364–5
Van Itterbeek, A., 8270, 8273
Van Vleck, J. H., 8524
Varshni, Y. P., 8363
Veenendaal, A. L., 8651
Verzaux, P., 8591
Vetter, K. J., 8738
Vincent, E., 8731
Vol'kenshtein, M. V., 8617
Volkova, K. A., 8553
Von Foerster, H., 8475
von Hippel, A., 8397
von Schelling, H., 8348

Waldmann, L., 8240
Walker, D., 8338, 8673
Walker, J., 8459–60
Walker, R. M., 8823
Walker, W. G., 8757
Wanders, G., 8208
Wapstra, A. H., 8651
Watanabe, M., 8771
Watanabe, S., 8230
Webber, R. T., 8426
Weil, L., 8572
Weinreich, G., 8641–2
Weintraub, S., 8593
Weiss, J., 8730
Weiss, P. R., 8514
Weizel, W., 8210
Wendt, G., 8450
Wenzel, A., 8350
West, G. W., 8722
Westfold, K. C., 8478
White, A. D., 8432
White, R. S., 8701
Whitman, C. I., 8361
Whittaker, D., 8380
Whittemore, W. L., 8688
Whyte, G. N., 8667
Wichert, G., 8301
Wiedling, T., 8652
Wijn, H. P. J., 8536, 8547, 8571
Wilde, K. A., 8755
Wilkens, J., 8271
Wilkie, M. J., 8258
Wilkins, J. J., 8657
Wilkinson, D. H., 8638–9, 8664
Wilkinson, M. K., 8525
Williams, D., 8750
Williams, H. J., 8534
Williamson, G. K., 8794
Willis, B. T. M., 8528
Willmott, J. C., 8682
Wilski, H., 8736
Wilson, A. R. W., 8810
Wilson, G. W., 8550
Wiśniewski, F. J., 8779
Wohlfarth, E. P., 8523
Wolfendale, A. W., 8703
Wolff, M. M., 8457
Wollan, E. O., 8527
Wolnik, S. J., 8818
Wood, D. E., 8824
Wooster, W. A., 8769
Wortmann, F. X., 8254
Wright, G. T., 8341
Wright, K. H. R., 8442
Wrinch, D., 8801–2

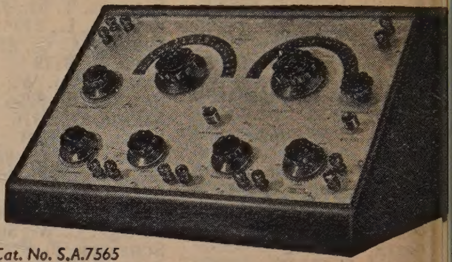
Yagi, T., 8500
Yamada, M., 8658, 8660
Yarwood, J., 8360
Yovanovitch, D. D., 8656
Yovanovitch, D. K., 8656
Yuill, A. M., 8735
Yvon, J., 8561

Zago, G., 8474, 8494
Zeiger, H. J., 8622
Zeldes, H., 8321
Zener, C., 8521
Zhdanov, G. S., 8799
Zimmer, E., 8589
Zimmer, E. L., 8479
Zimmermann, W., 8219
Zorn, G. T., 8671
Zünti, W., 8704
Zwolinski, B. J., 8755

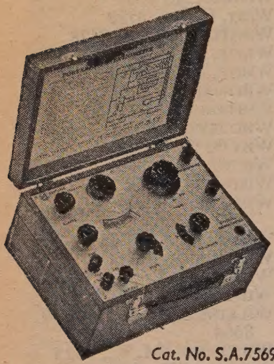
MEASUREMENT OF DC VOLTAG

PYE UNIVERSAL PRECISION POTENTIOMETER

Range 0 to 1.75 volts. Each division of the circular slide wire scale is equal to 100 micro-volts. Small negative range of 500 micro-volts is provided. Multipliers of 0.1 and 0.01 convert each scale division to 10 micro-volts and 1 micro-volt respectively. Simplified standardization. Compartments for standard cell and accumulator built into the case. Minalpha coils. Accuracy ± 0.02% or ± 1 slide-wire division.



Cat. No. S.A.7565



Cat. No. S.A.7569/P

PYE PORTABLE POTENTIOMETER

Range 0 to 1.8 volts. Each division of the circular slide wire is equal t 1 mV. Multipliers of 0.1 and 0.01 convert each scale division into 100 μ and 10 μV respectively. An accumulator is housed in an internal compar ment and is accessible through a small door in the case. A robust tau suspension galvanometer is built-in and provision is made for an externa galvanometer to be used. Built-in Standard Cell. Accuracy ± 0.1% c ± 1 slide-wire division.

PYE PRECISION VERNIER POTENTIOMETER

Direct-reading on three dials. Range 0 to 1.901 volts. Each division of lowest dial is 10 micro-volts. Negative range of 1 division provided. Multiplier of 0.1 converts each division of lowest dial to 1 micro-volt. Simplified standardization. Compartments for standard cell and accumulator built into the case. Minalpha coils Accuracy ± 0.002% or ± one division of lowest dial.

Cat. No. S.A.7568

SCIENTIFIC PYE INSTRUMENTS

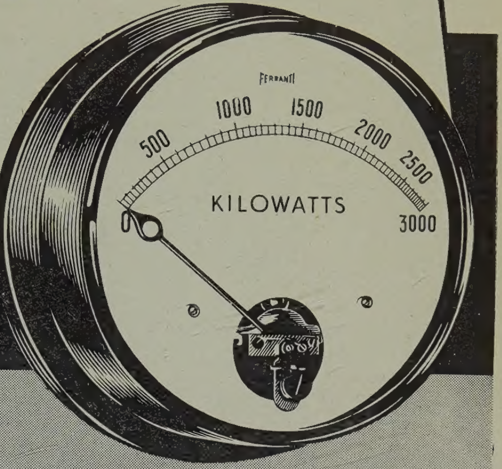
Please write for fuller details of these instruments and any accessories such as galvanometers, shunts, cells, etc. that may be required.

The new Catalogue "H" covering our range of instruments is now available

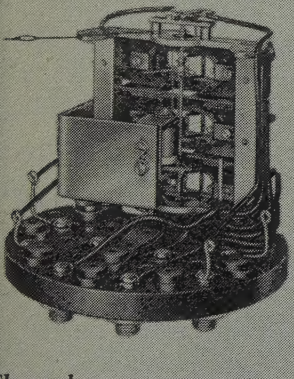
W. G. PYE & CO. LTD · GRANTA WORKS · CAMBRIDGE

WATTMETERS

- New Design
- Compact
- Good Delivery

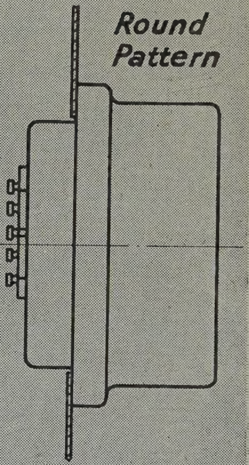


FERRANTI



Three-element movement for 3-phase 4-wire unbalanced load wattmeters

The illustration shows a 4″ dial 3-phase 4-wire unbalanced load dynamometer wattmeter with three elements. Shallow pressed steel case. Two or three elements for balanced or unbalanced load. Small V.A. burden. 4″, 6″ or 8″ round or square dial, semi-projecting or flush mounting. Other recently designed Ferranti instruments include ammeters, voltmeters, power factor meters and frequency meters. All types are also available in hermetically sealed cases.



FERRANTI *Switchboard Instruments*

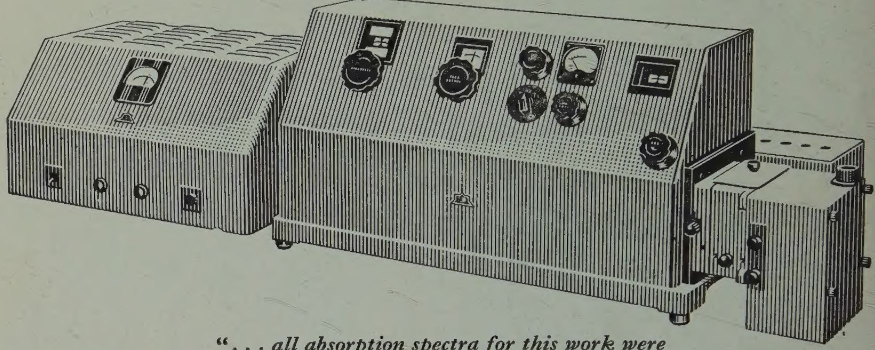
FERRANTI LTD · MOSTON · MANCHESTER

Head Office and Works: HOLLINWOOD · LANCS *London Office:* KERN HOUSE · KINGSWAY W.C.2

FI 124

RELIABLE IN ALL
WORKING CONDITIONS

". . . the most convenient method was found to be ultraviolet absorption measurement . . ."



". . . all absorption spectra for this work were measured with a Unicam Quartz Spectrophotometer model SP.500 . . ."

The frequency with which the Unicam SP.500 is mentioned in the literature is convincing proof of the sustained quality of its performance and of the wide variety of applications for which it is particularly suitable. For the maintenance of standards of both raw materials and the final product, for academic and medical research, wherever there is a problem of analysis or control, the easiest, most efficient, most economical answer may well be the Unicam SP.500 Spectrophotometer.

An illustrated leaflet describing the instrument in detail will gladly be sent on request.

UNICAM

UNICAM INSTRUMENTS LTD · ARBURY WORKS · CAMBRIDGE

U124B

Copyright

Annual Subscription £2 10*s*. 0*d*., *both sections* £4 10*s*. 0*d*. *Single numbers*, 5*s*. 0*d*.
Also published in an edition printed on one side of the paper (without indexes).
Obtainable from THE INSTITUTION OF ELECTRICAL ENGINEERS, SAVOY PLACE, LONDON, W.C.2.
Printed by UNWIN BROTHERS LIMITED, WOKING AND LONDON